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KIM et al.

(54) **USER TERMINAL DEVICE AND SYSTEM FOR PERFORMING USER CUSTOMIZED HEALTH MANAGEMENT, AND METHODS THEREOF**

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USPC **705/2**

(57) **ABSTRACT**

A user health management method and device are provided. The user health management method includes receiving data from a data source using short-range wireless communication, the data indicating health-related information, determining health-related behavior information of a user based on the health-related information, generating a health care recommendation for the user based on the health-related behavior information, and outputting the health care recommendation.

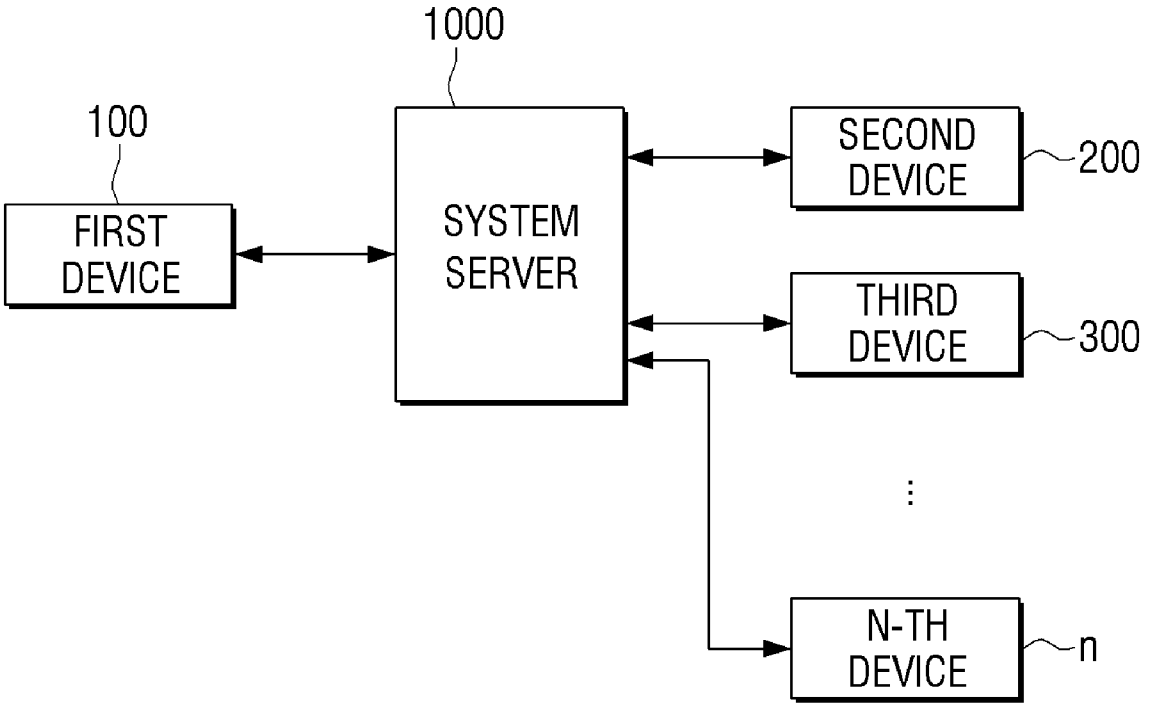


FIG. 1

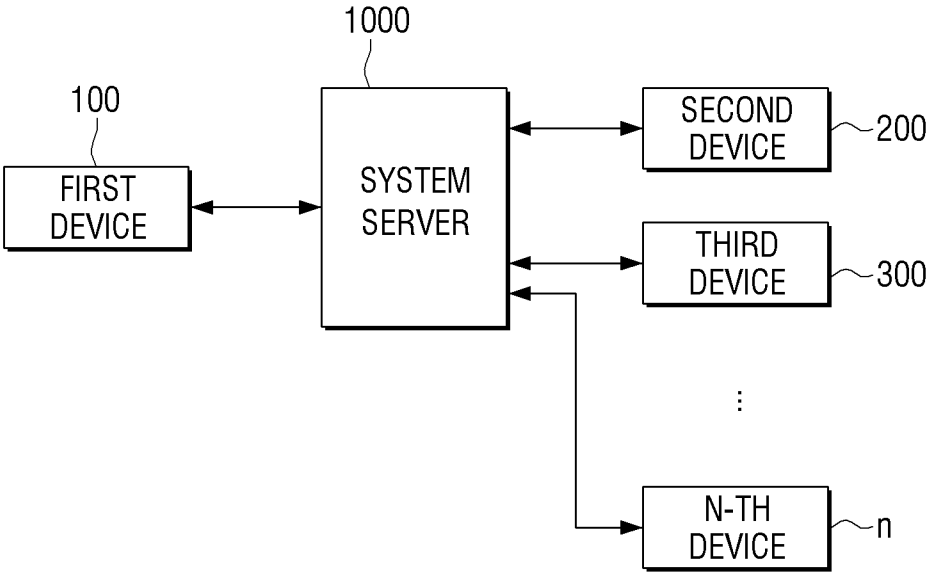

1000
100
FIRST DEVICE
SYSTEM SERVER
SECOND DEVICE
200
THIRD DEVICE
300
N-TH DEVICE
n

FIG. 2

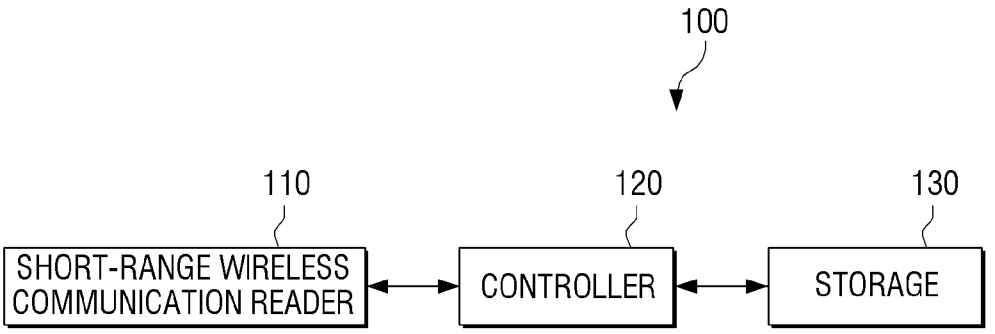

100
110
120
130
SHORT-RANGE WIRELESS COMMUNICATION READER
CONTROLLER
STORAGE

FIG. 3

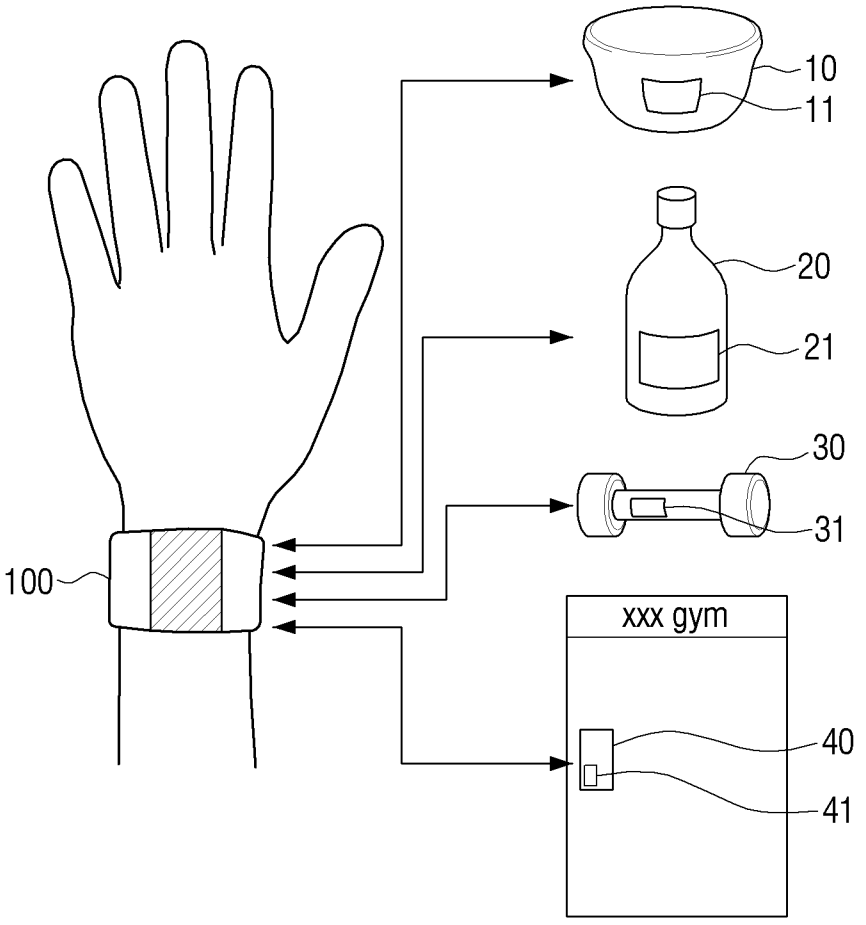


FIG. 4

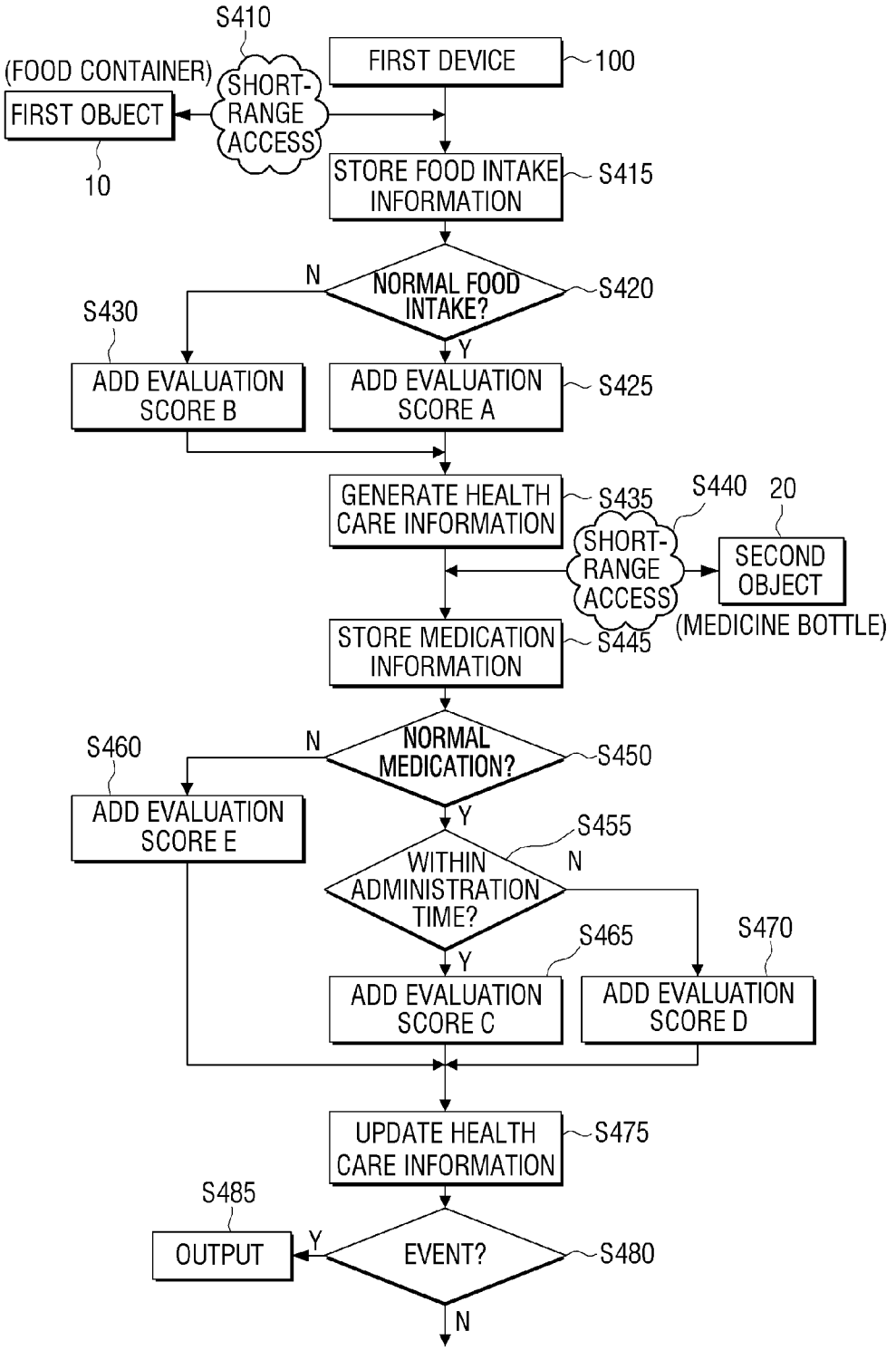

S410
(FOOD CONTAINER)
FIRST OBJECT
10
SHORT-RANGE ACCESS
FIRST DEVICE
100
STORE FOOD INTAKE INFORMATION
S415
NORMAL FOOD INTAKE?
S420
N
Y
S430
ADD EVALUATION SCORE B
ADD EVALUATION SCORE A
S425
GENERATE HEALTH CARE INFORMATION
S435
S440
20
SHORT-RANGE ACCESS
SECOND OBJECT
(MEDICINE BOTTLE)
STORE MEDICATION INFORMATION
S445
NORMAL MEDICATION?
S450
S460
ADD EVALUATION SCORE E
WITHIN ADMINISTRATION TIME?
S455
S465
S470
ADD EVALUATION SCORE C
ADD EVALUATION SCORE D
UPDATE HEALTH CARE INFORMATION
S475
S485
OUTPUT
EVENT?
S480

FIG. 5

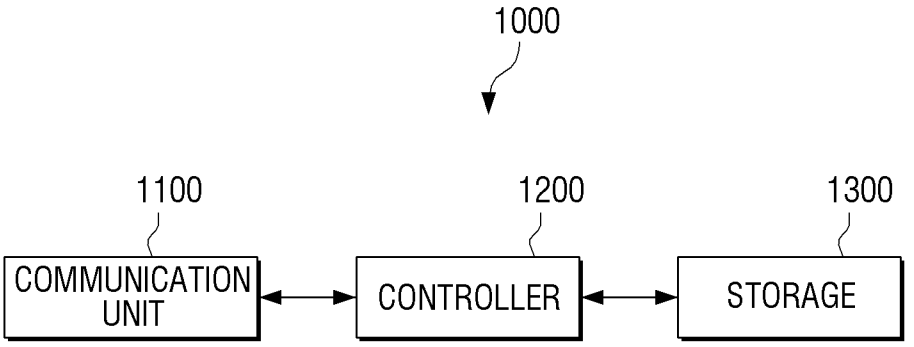

1000
1100
1200
1300
COMMUNICATION UNIT
CONTROLLER
STORAGE

FIG. 6

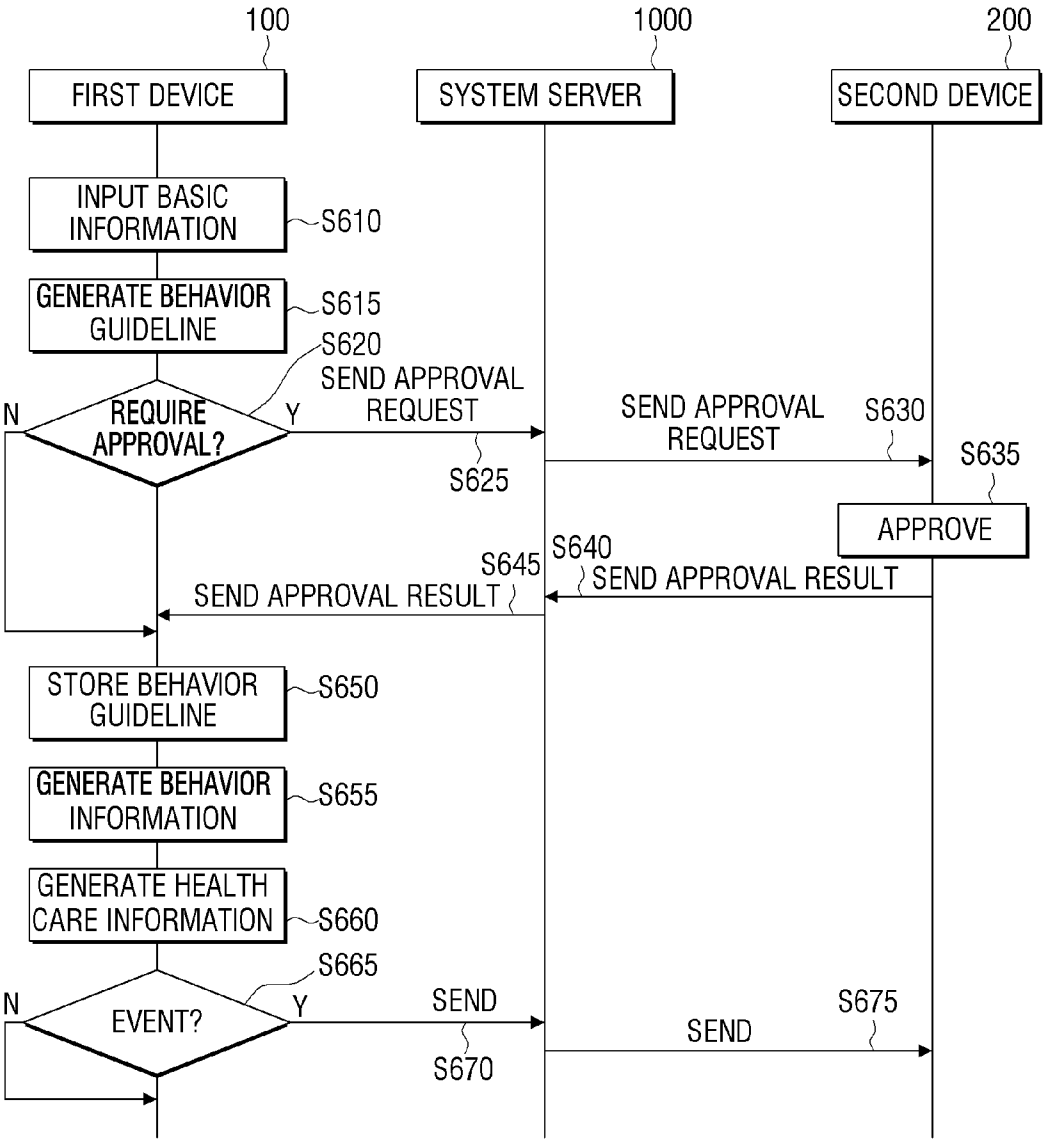

100
1000
200
FIRST DEVICE
SYSTEM SERVER
SECOND DEVICE
INPUT BASIC INFORMATION
S610
GENERATE BEHAVIOR GUIDELINE
S615
S620
REQUIRE APPROVAL?
N
Y
SEND APPROVAL REQUEST
S625
SEND APPROVAL REQUEST
S630
S635
APPROVE
S640
SEND APPROVAL RESULT
S645
SEND APPROVAL RESULT
STORE BEHAVIOR GUIDELINE
S650
GENERATE BEHAVIOR INFORMATION
S655
GENERATE HEALTH CARE INFORMATION
S660
S665
EVENT?
N
Y
SEND
S670
SEND
S675

FIG. 7

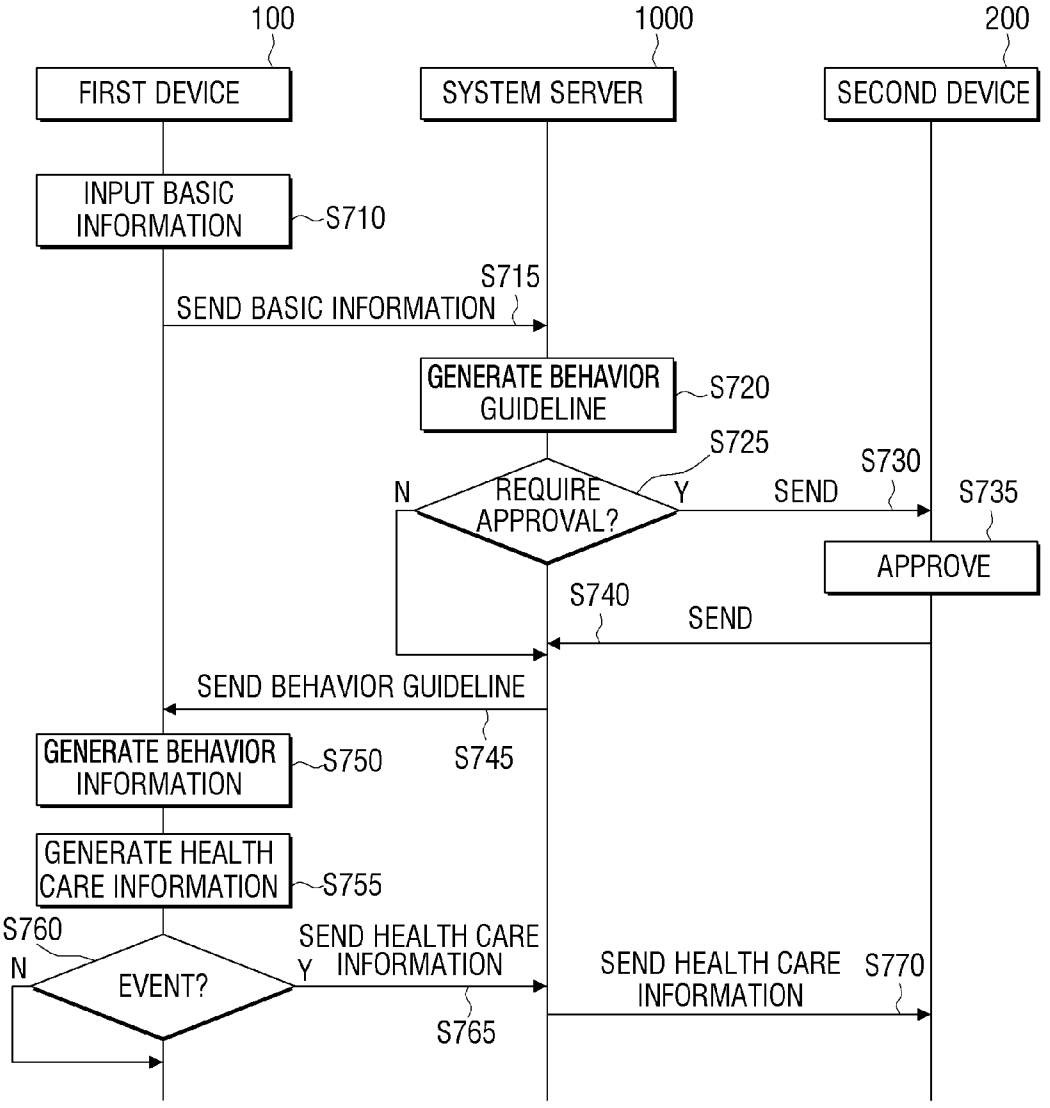

100
1000
200
FIRST DEVICE
SYSTEM SERVER
SECOND DEVICE
INPUT BASIC INFORMATION
S710
S715
SEND BASIC INFORMATION
GENERATE BEHAVIOR GUIDELINE
S720
S725
N
REQUIRE APPROVAL?
Y
SEND
S730
S735
APPROVE
S740
SEND
SEND BEHAVIOR GUIDELINE
S745
GENERATE BEHAVIOR INFORMATION
S750
GENERATE HEALTH CARE INFORMATION
S755
S760
N
EVENT?
Y
SEND HEALTH CARE INFORMATION
S765
SEND HEALTH CARE INFORMATION
S770

FIG. 8

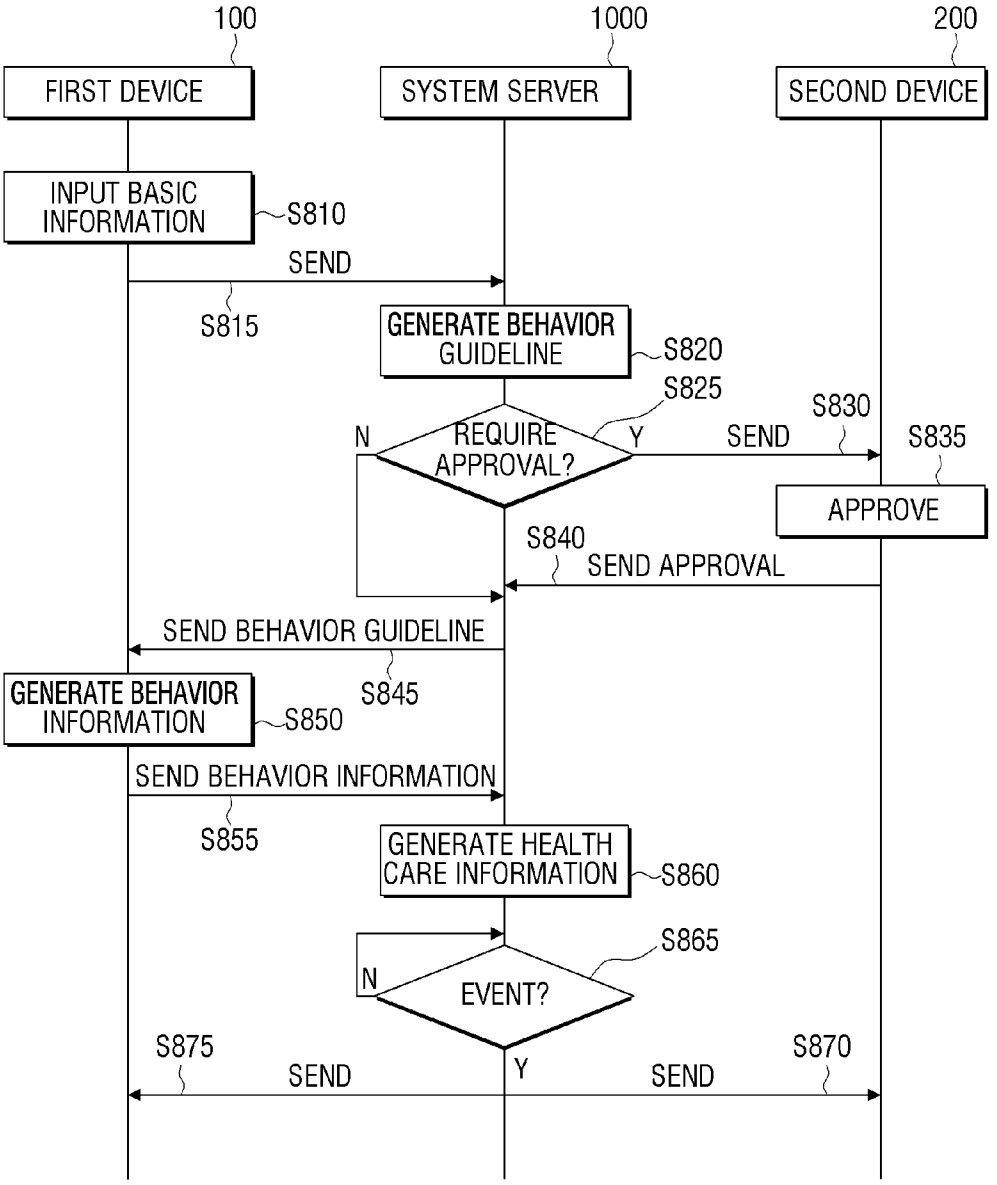

100
1000
200
FIRST DEVICE
SYSTEM SERVER
SECOND DEVICE
INPUT BASIC INFORMATION
S810
SEND
S815
GENERATE BEHAVIOR GUIDELINE
S820
S825
N
REQUIRE APPROVAL?
Y
SEND
S830
S835
APPROVE
S840
SEND APPROVAL
SEND BEHAVIOR GUIDELINE
S845
GENERATE BEHAVIOR INFORMATION
S850
SEND BEHAVIOR INFORMATION
S855
GENERATE HEALTH CARE INFORMATION
S860
S865
N
EVENT?
S875
SEND
Y
SEND
S870

FIG. 9

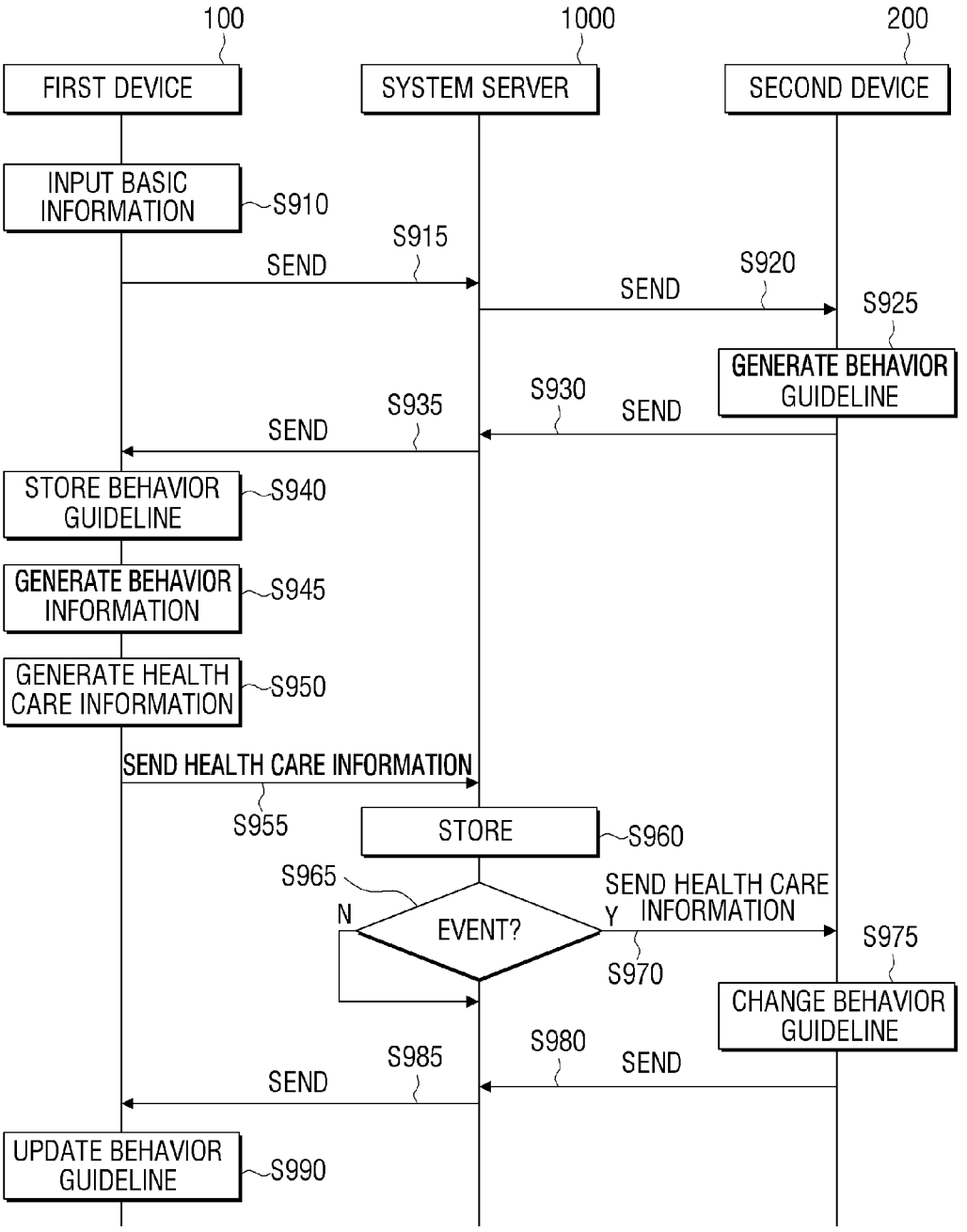

100
1000
200
FIRST DEVICE
SYSTEM SERVER
SECOND DEVICE
INPUT BASIC INFORMATION
S910
S915
SEND
S920
SEND
S925
GENERATE BEHAVIOR GUIDELINE
S930
SEND
S935
SEND
STORE BEHAVIOR GUIDELINE
S940
GENERATE BEHAVIOR INFORMATION
S945
GENERATE HEALTH CARE INFORMATION
S950
SEND HEALTH CARE INFORMATION
S955
STORE
S960
S965
N
EVENT?
Y
SEND HEALTH CARE INFORMATION
S970
S975
CHANGE BEHAVIOR GUIDELINE
S980
SEND
S985
SEND
UPDATE BEHAVIOR GUIDELINE
S990

FIG. 10

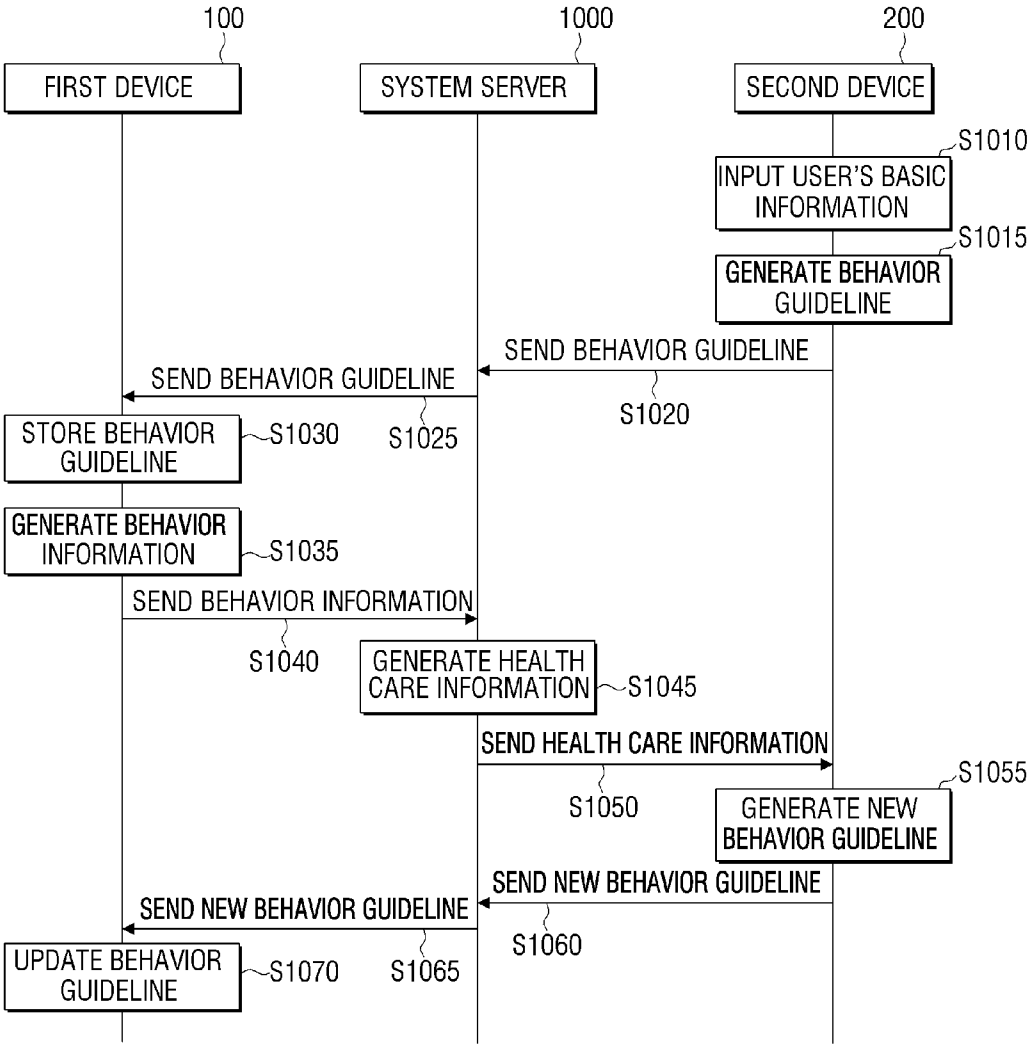

100
1000
200
FIRST DEVICE
SYSTEM SERVER
SECOND DEVICE
S1010
INPUT USER'S BASIC INFORMATION
S1015
GENERATE BEHAVIOR GUIDELINE
SEND BEHAVIOR GUIDELINE
S1020
SEND BEHAVIOR GUIDELINE
S1025
STORE BEHAVIOR GUIDELINE
S1030
GENERATE BEHAVIOR INFORMATION
S1035
SEND BEHAVIOR INFORMATION
S1040
GENERATE HEALTH CARE INFORMATION
S1045
SEND HEALTH CARE INFORMATION
S1050
S1055
GENERATE NEW BEHAVIOR GUIDELINE
SEND NEW BEHAVIOR GUIDELINE
S1060
SEND NEW BEHAVIOR GUIDELINE
S1065
UPDATE BEHAVIOR GUIDELINE
S1070

FIG. 11

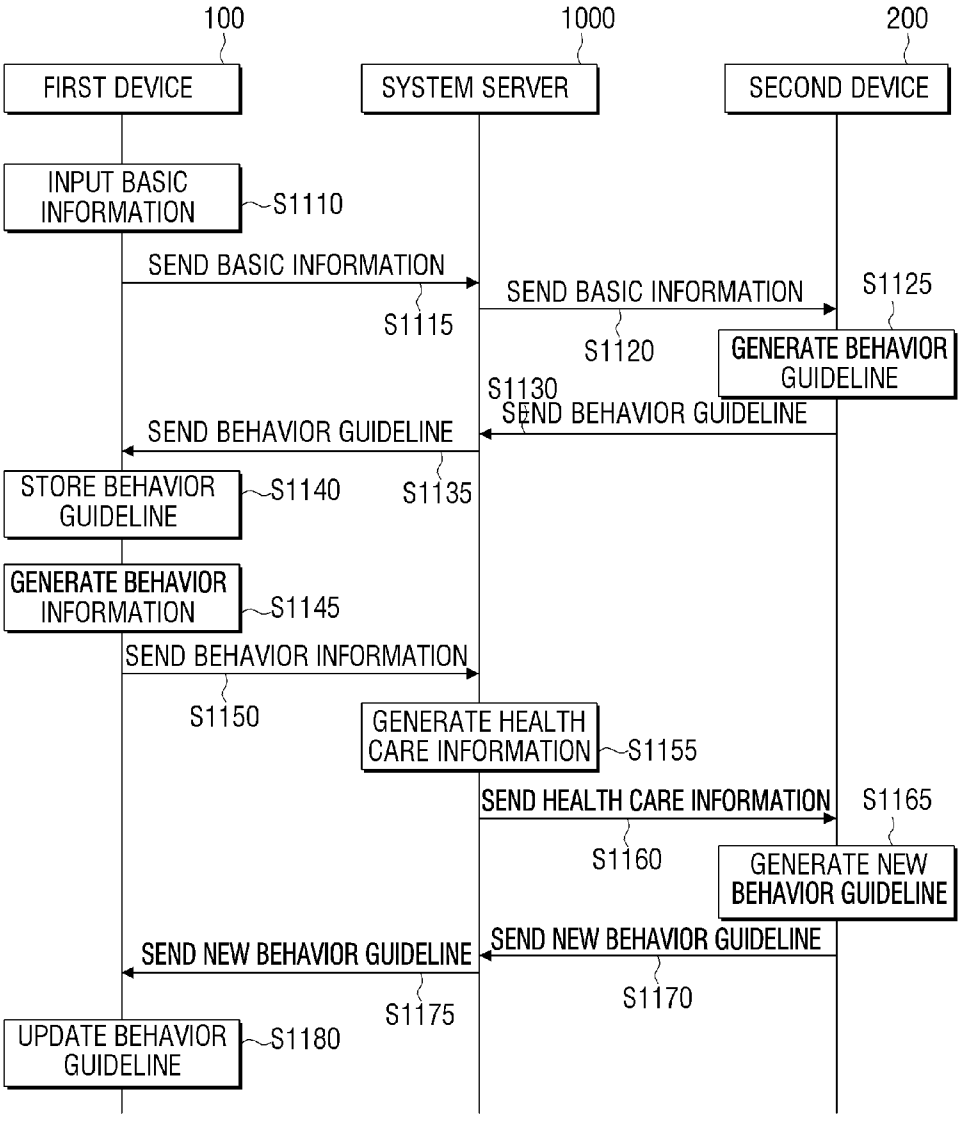

100
1000
200
FIRST DEVICE
SYSTEM SERVER
SECOND DEVICE
INPUT BASIC INFORMATION
S1110
SEND BASIC INFORMATION
S1115
SEND BASIC INFORMATION
S1120
S1125
GENERATE BEHAVIOR GUIDELINE
S1130
SEND BEHAVIOR GUIDELINE
SEND BEHAVIOR GUIDELINE
S1135
STORE BEHAVIOR GUIDELINE
S1140
GENERATE BEHAVIOR INFORMATION
S1145
SEND BEHAVIOR INFORMATION
S1150
GENERATE HEALTH CARE INFORMATION
S1155
SEND HEALTH CARE INFORMATION
S1160
S1165
GENERATE NEW BEHAVIOR GUIDELINE
SEND NEW BEHAVIOR GUIDELINE
SEND NEW BEHAVIOR GUIDELINE
S1170
S1175
UPDATE BEHAVIOR GUIDELINE
S1180

FIG. 12

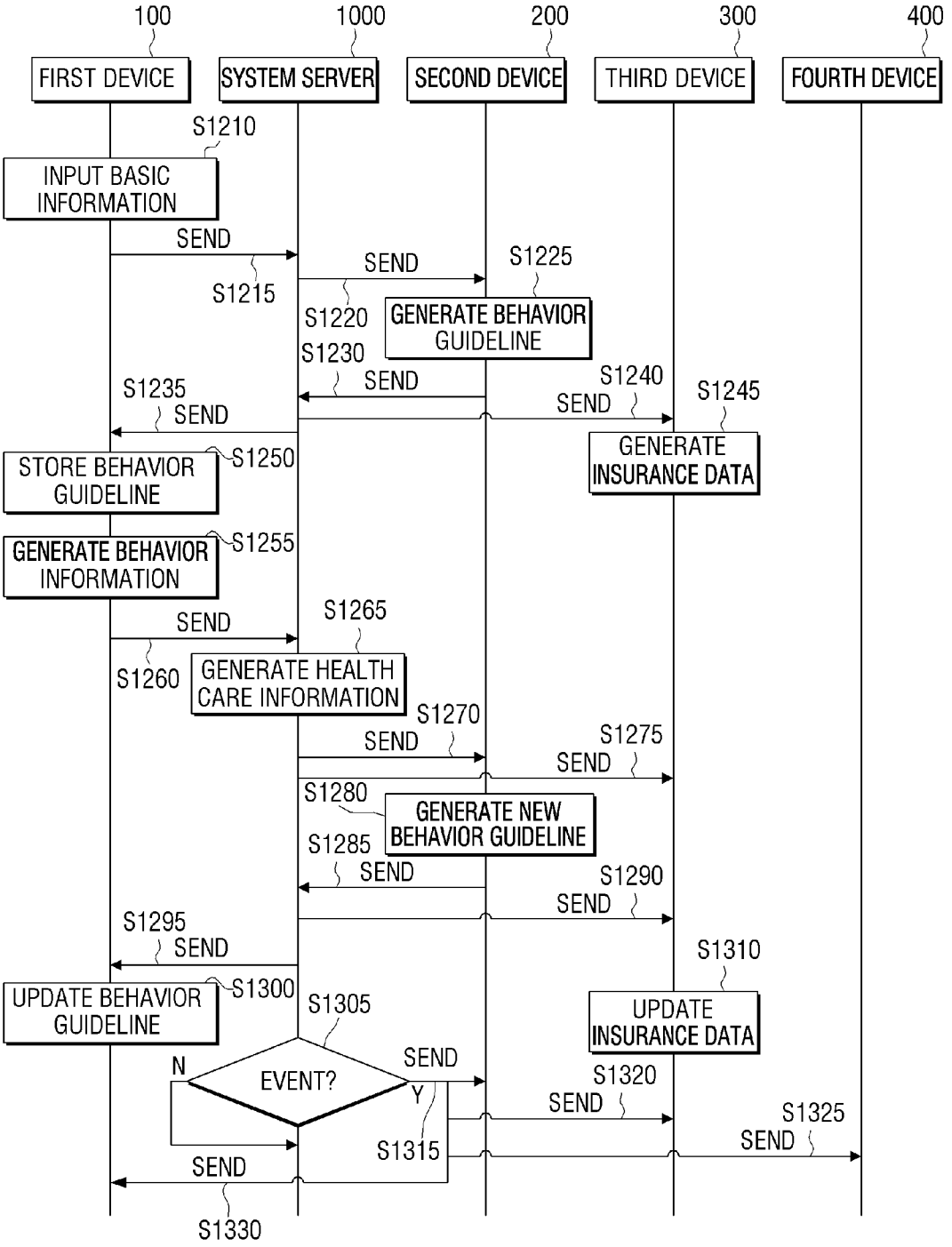

100
1000
200
300
400
FIRST DEVICE
SYSTEM SERVER
SECOND DEVICE
THIRD DEVICE
FOURTH DEVICE
S1210
INPUT BASIC INFORMATION
SEND
S1215
SEND
S1220
S1225
GENERATE BEHAVIOR GUIDELINE
S1230
SEND
S1235
SEND
S1240
SEND
S1245
GENERATE INSURANCE DATA
STORE BEHAVIOR GUIDELINE
S1250
GENERATE BEHAVIOR INFORMATION
S1255
SEND
S1260
S1265
GENERATE HEALTH CARE INFORMATION
S1270
SEND
S1275
SEND
S1280
GENERATE NEW BEHAVIOR GUIDELINE
S1285
SEND
S1290
SEND
S1295
SEND
S1310
UPDATE BEHAVIOR GUIDELINE
S1300
S1305
UPDATE INSURANCE DATA
N
EVENT?
Y
SEND
S1320
SEND
S1325
SEND
S1315
SEND
S1330

FIG. 13

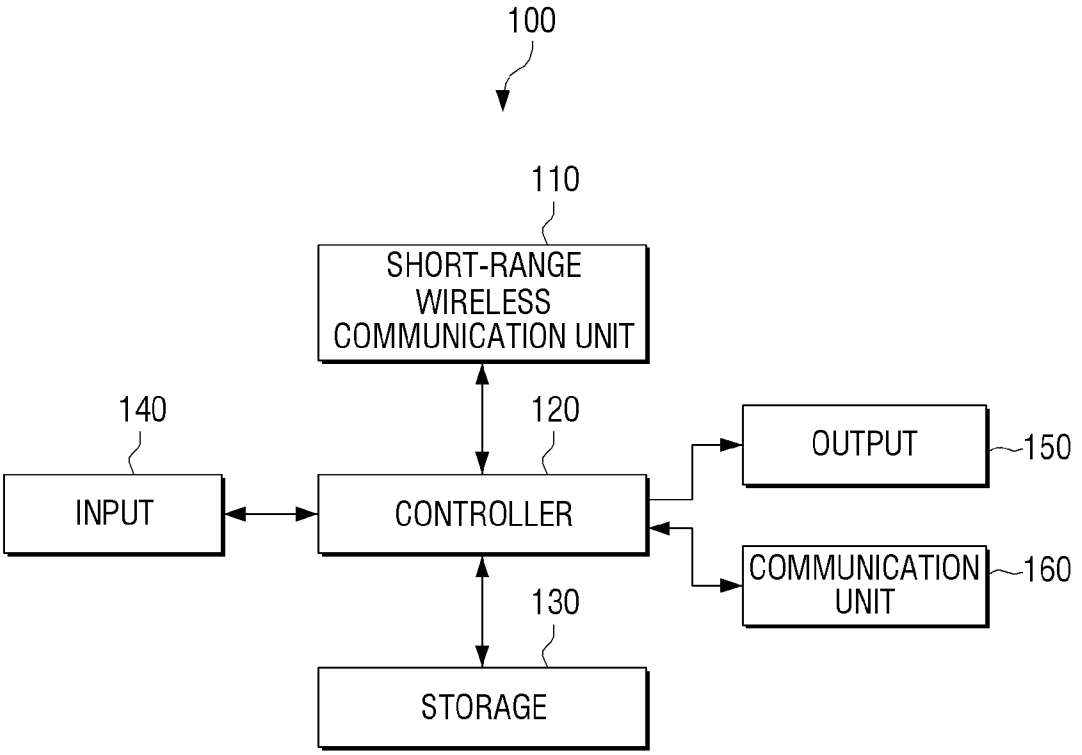

100
110
SHORT-RANGE WIRELESS COMMUNICATION UNIT
140
120
OUTPUT
150
INPUT
CONTROLLER
COMMUNICATION UNIT
160
130
STORAGE

FIG. 14

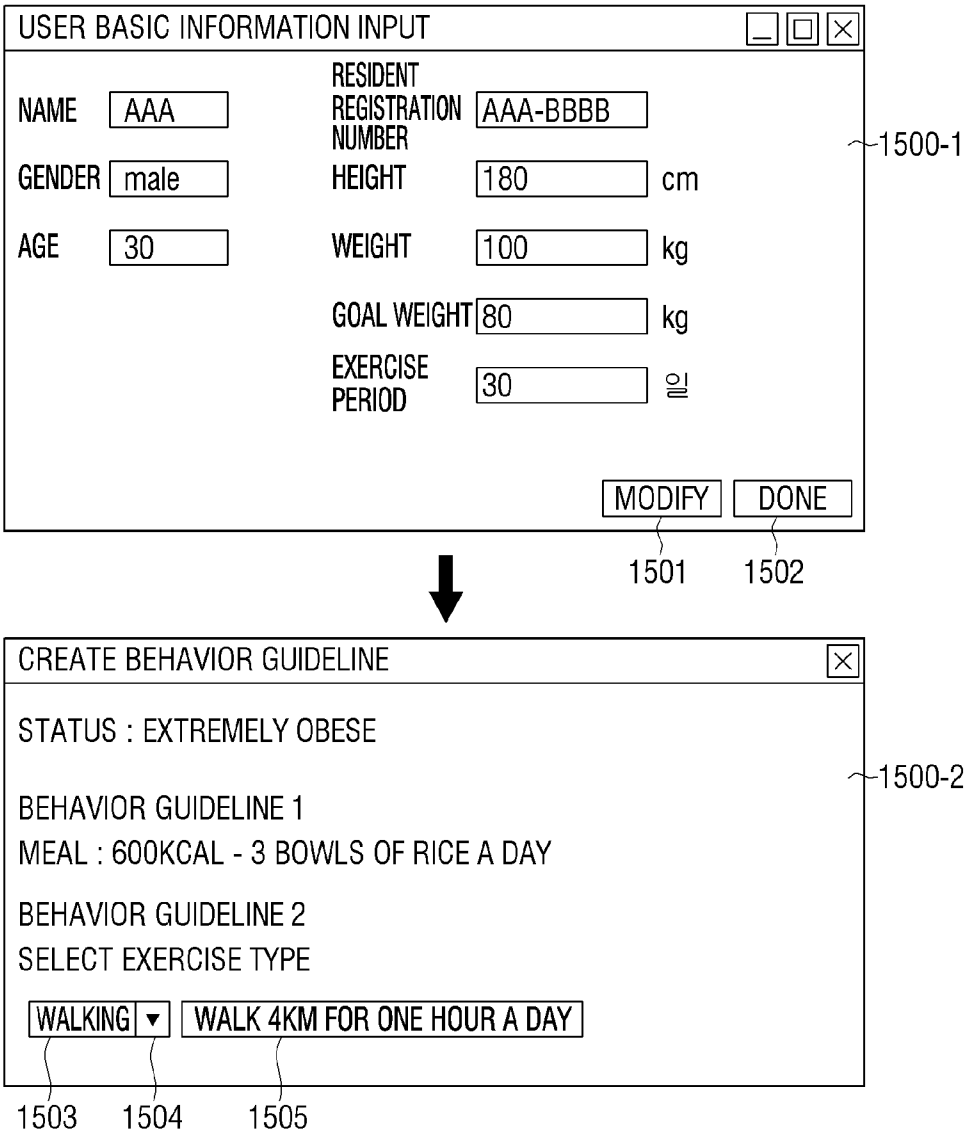

USER BASIC INFORMATION INPUT
NAME
AAA
RESIDENT REGISTRATION NUMBER
AAA-BBBB
GENDER
male
HEIGHT
180
cm
AGE
30
WEIGHT
100
kg
GOAL WEIGHT
80
kg
EXERCISE PERIOD
30
일
MODIFY
DONE
1500-1
1501
1502
CREATE BEHAVIOR GUIDELINE
STATUS : EXTREMELY OBESE
BEHAVIOR GUIDELINE 1
MEAL : 600KCAL - 3 BOWLS OF RICE A DAY
BEHAVIOR GUIDELINE 2
SELECT EXERCISE TYPE
WALKING
WALK 4KM FOR ONE HOUR A DAY
1500-2
1503
1504
1505

FIG. 15

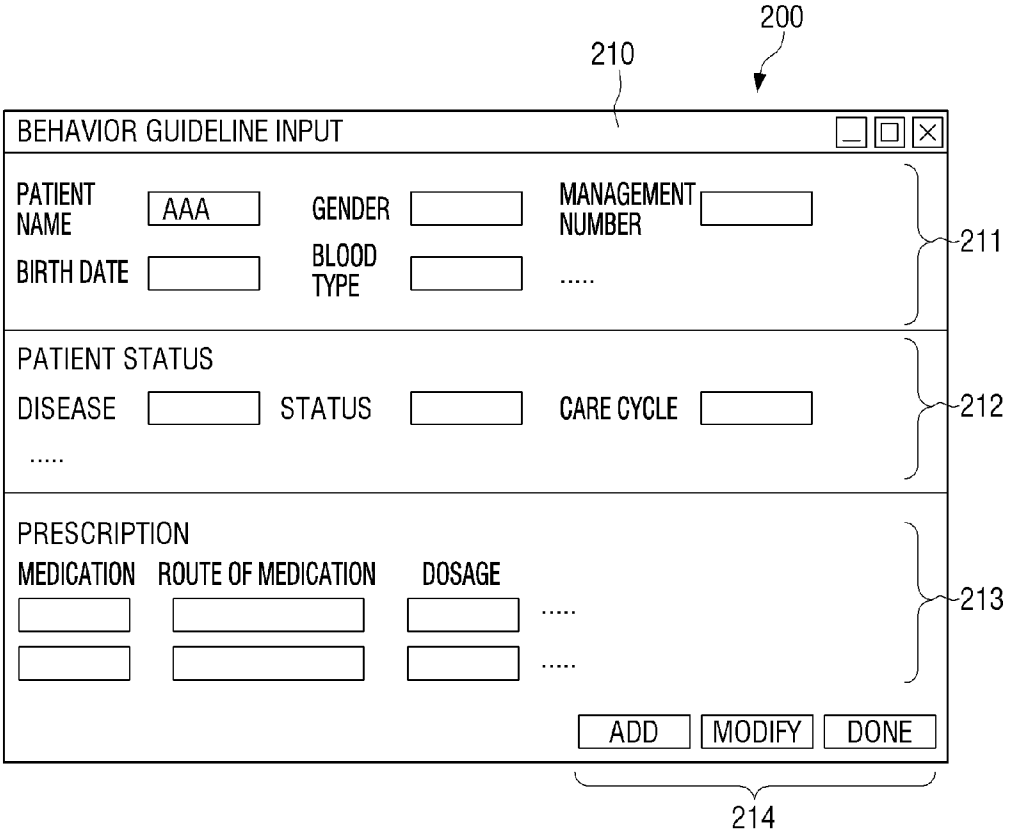

200
210
BEHAVIOR GUIDELINE INPUT
PATIENT NAME
AAA
GENDER
MANAGEMENT NUMBER
BIRTH DATE
BLOOD TYPE
.....
211
PATIENT STATUS
DISEASE
STATUS
CARE CYCLE
.....
212
PRESCRIPTION
MEDICATION
ROUTE OF MEDICATION
DOSAGE
.....
.....
213
ADD
MODIFY
DONE
214

FIG. 16

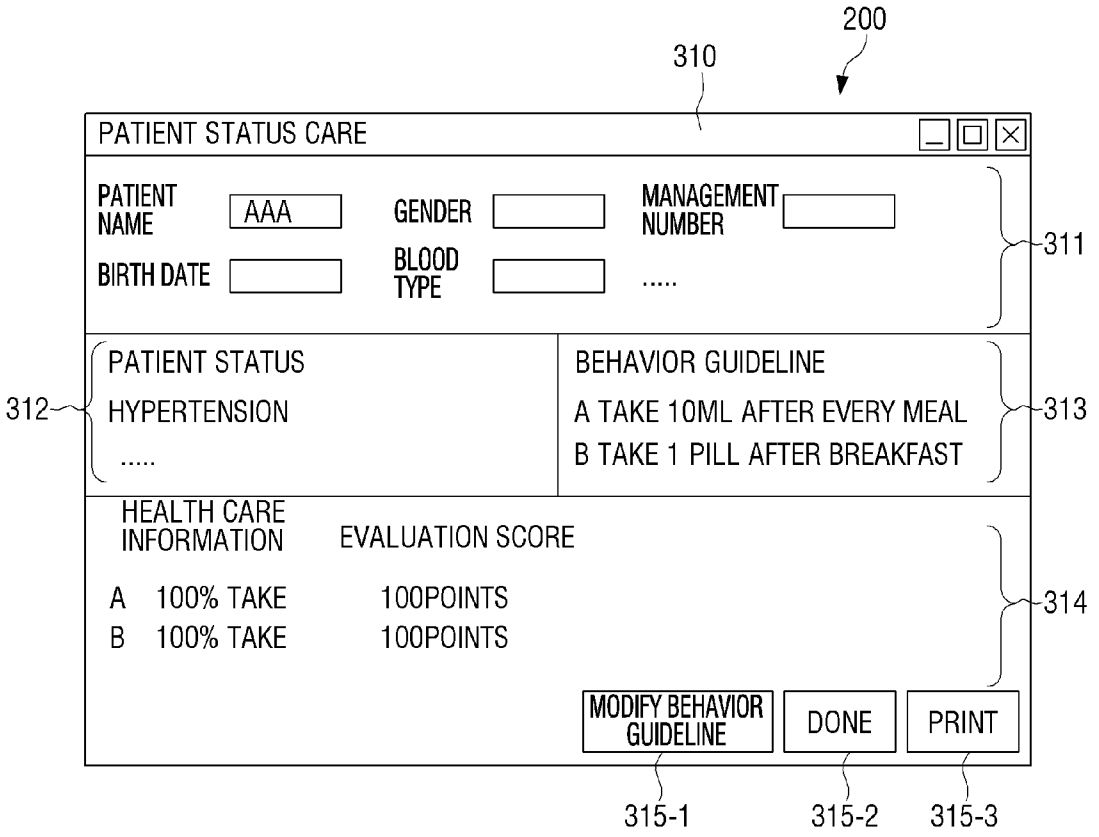

200
310
PATIENT STATUS CARE
PATIENT NAME
AAA
GENDER
MANAGEMENT NUMBER
BIRTH DATE
BLOOD TYPE
.....
311
PATIENT STATUS
HYPERTENSION
.....
312
BEHAVIOR GUIDELINE
A TAKE 10ML AFTER EVERY MEAL
B TAKE 1 PILL AFTER BREAKFAST
313
HEALTH CARE INFORMATION
EVALUATION SCORE
A 100% TAKE 100POINTS
B 100% TAKE 100POINTS
314
MODIFY BEHAVIOR GUIDELINE
DONE
PRINT
315-1
315-2
315-3

FIG. 17

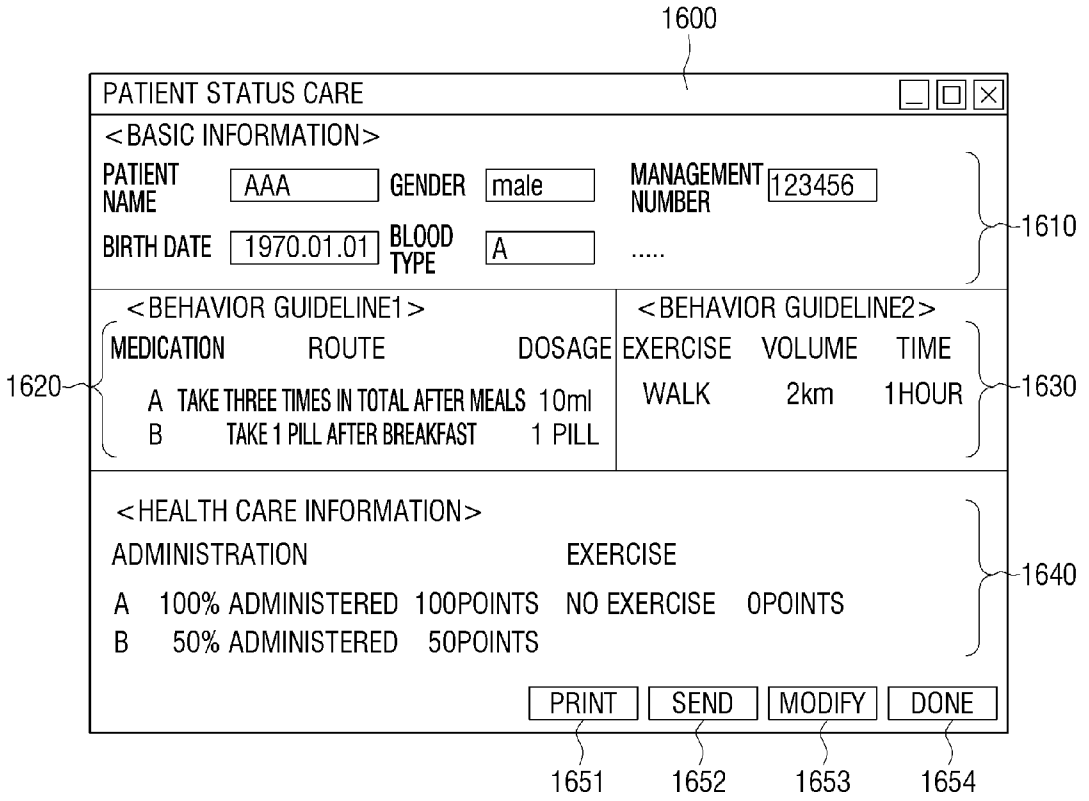

1600
PATIENT STATUS CARE
<BASIC INFORMATION>
PATIENT NAME
AAA
GENDER
male
MANAGEMENT NUMBER
123456
BIRTH DATE
1970.01.01
BLOOD TYPE
A
.....
1610
<BEHAVIOR GUIDELINE1>
MEDICATION
ROUTE
DOSAGE
A TAKE THREE TIMES IN TOTAL AFTER MEALS 10ml
B TAKE 1 PILL AFTER BREAKFAST 1 PILL
1620
<BEHAVIOR GUIDELINE2>
EXERCISE
VOLUME
TIME
WALK
2km
1HOUR
1630
<HEALTH CARE INFORMATION>
ADMINISTRATION
EXERCISE
A 100% ADMINISTERED 100POINTS
NO EXERCISE 0POINTS
B 50% ADMINISTERED 50POINTS
1640
PRINT
SEND
MODIFY
DONE
1651
1652
1653
1654

FIG. 18

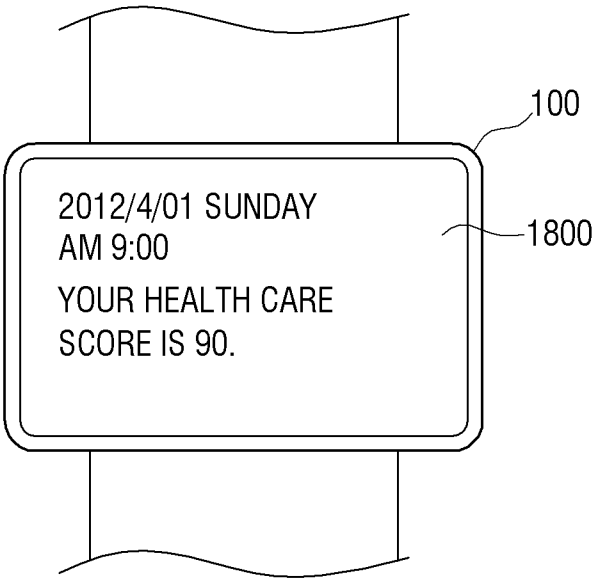


FIG. 19

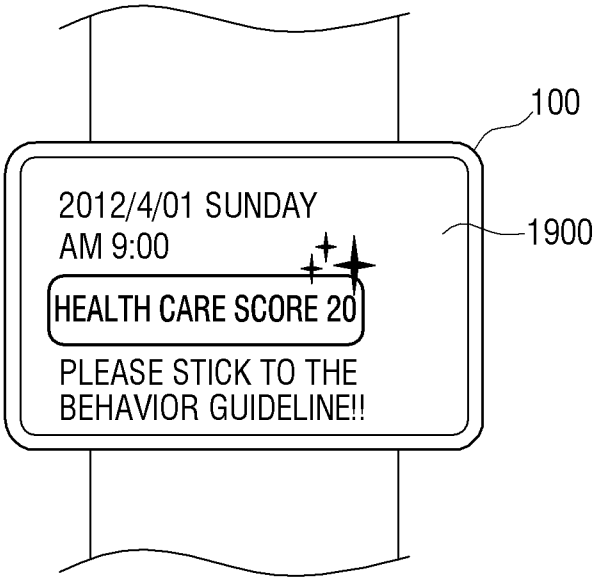

100
2012/4/01 SUNDAY
AM 9:00
1900
HEALTH CARE SCORE 20
PLEASE STICK TO THE
BEHAVIOR GUIDELINE!!

FIG. 20

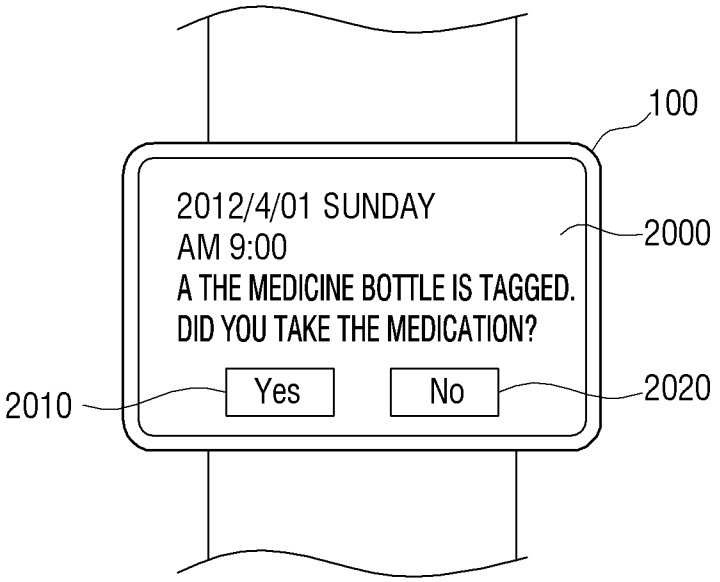

100
2012/4/01 SUNDAY
AM 9:00
A THE MEDICINE BOTTLE IS TAGGED.
DID YOU TAKE THE MEDICATION?
2000
Yes
No
2010
2020

FIG. 21

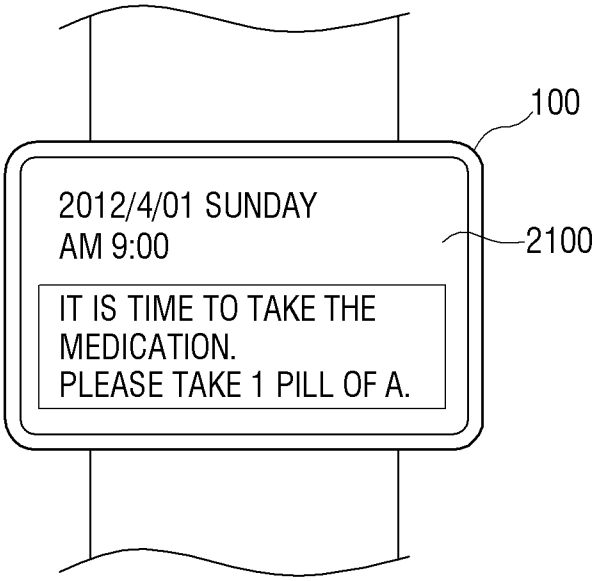

100
2012/4/01 SUNDAY
AM 9:00
2100
IT IS TIME TO TAKE THE MEDICATION.
PLEASE TAKE 1 PILL OF A.

FIG. 22

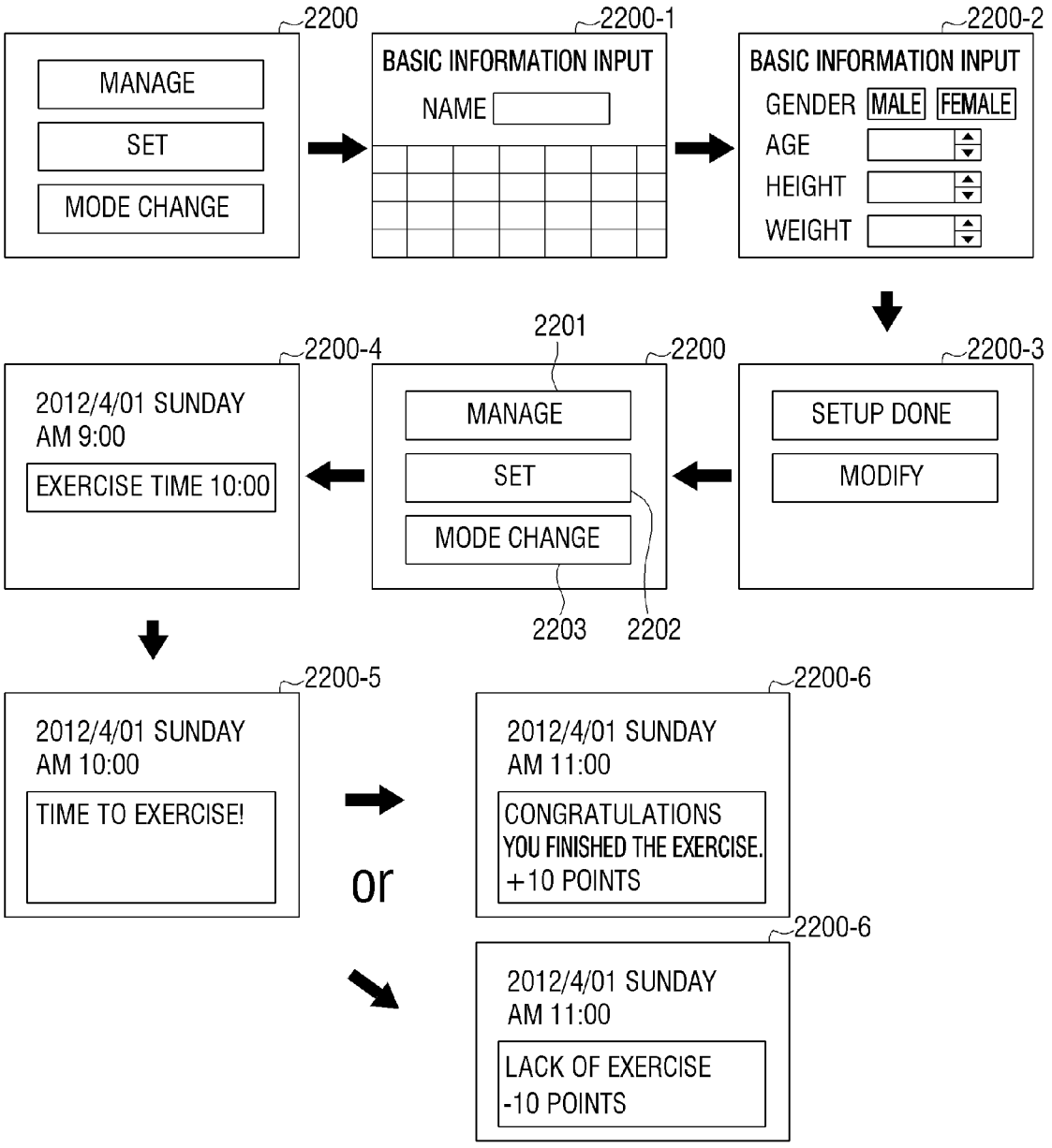

2200
MANAGE
SET
MODE CHANGE
2200-1
BASIC INFORMATION INPUT
NAME
2200-2
BASIC INFORMATION INPUT
GENDER MALE FEMALE
AGE
HEIGHT
WEIGHT
2200-3
SETUP DONE
MODIFY
2201
2200
MANAGE
SET
MODE CHANGE
2203
2202
2200-4
2012/4/01 SUNDAY
AM 9:00
EXERCISE TIME 10:00
2200-5
2012/4/01 SUNDAY
AM 10:00
TIME TO EXERCISE!
or
2200-6
2012/4/01 SUNDAY
AM 11:00
CONGRATULATIONS
YOU FINISHED THE EXERCISE.
+10 POINTS
2200-6
2012/4/01 SUNDAY
AM 11:00
LACK OF EXERCISE
-10 POINTS

FIG. 23

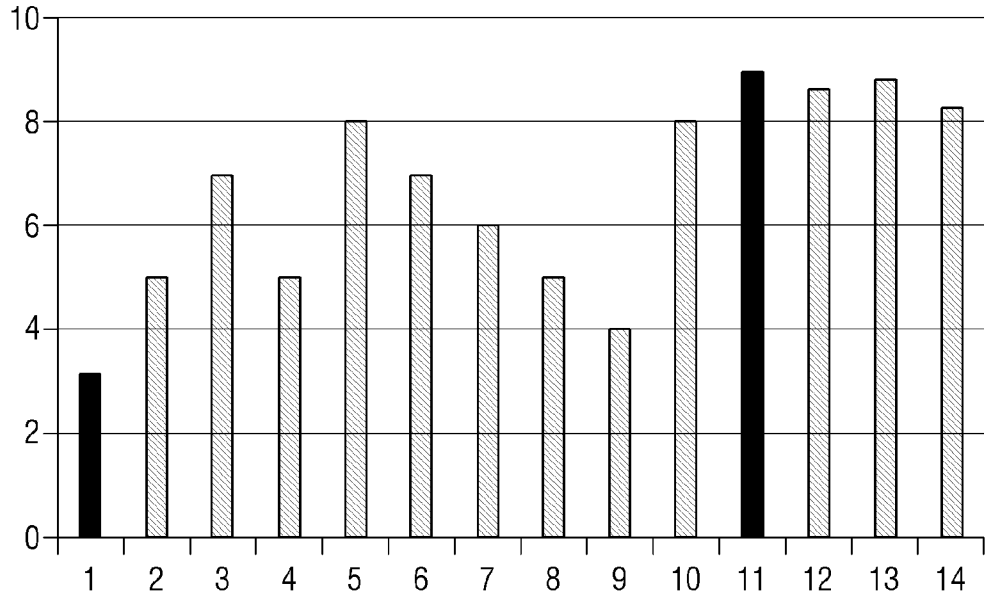


FIG. 24

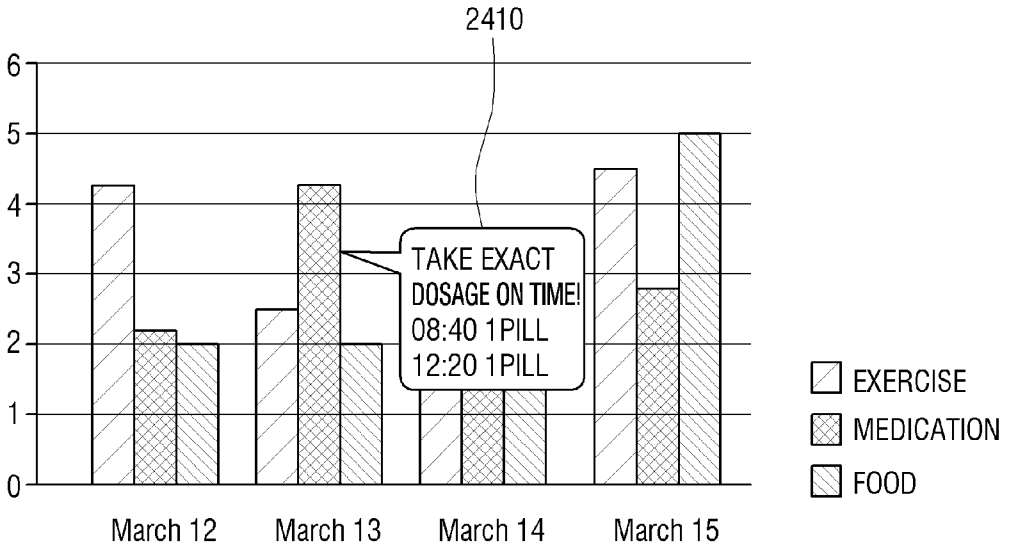

2410
6
5
4
3
2
1
0
TAKE EXACT
DOSAGE ON TIME!
08:40 1PILL
12:20 1PILL
March 12
March 13
March 14
March 15
EXERCISE
MEDICATION
FOOD

FIG. 25

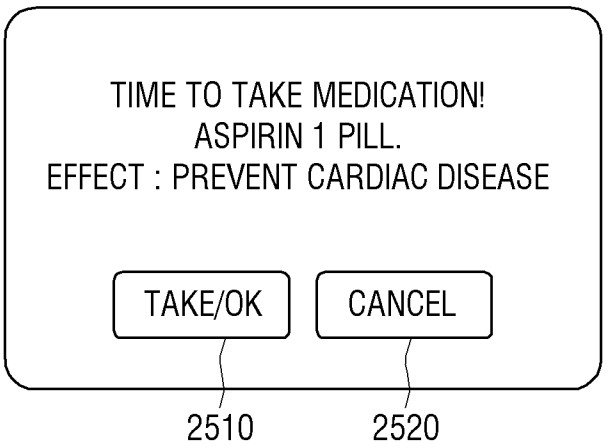

TIME TO TAKE MEDICATION!
ASPIRIN 1 PILL.
EFFECT : PREVENT CARDIAC DISEASE
TAKE/OK
CANCEL
2510
2520

FIG. 26

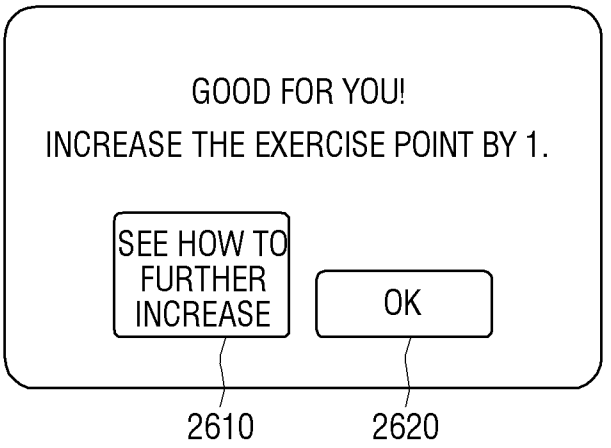

GOOD FOR YOU!
INCREASE THE EXERCISE POINT BY 1.
SEE HOW TO FURTHER INCREASE
OK
2610
2620

FIG. 27

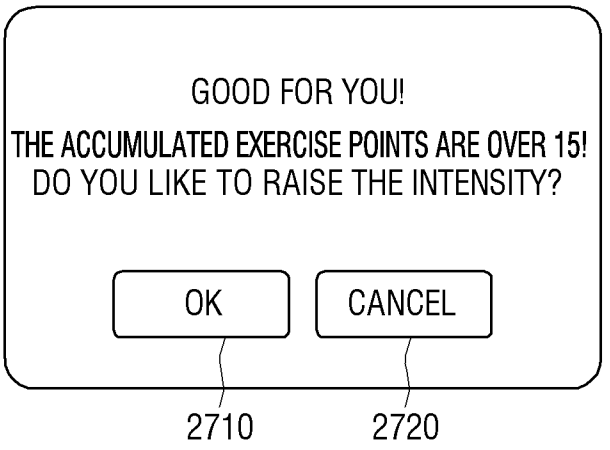

GOOD FOR YOU!
THE ACCUMULATED EXERCISE POINTS ARE OVER 15!
DO YOU LIKE TO RAISE THE INTENSITY?
OK
CANCEL
2710
2720

FIG. 28

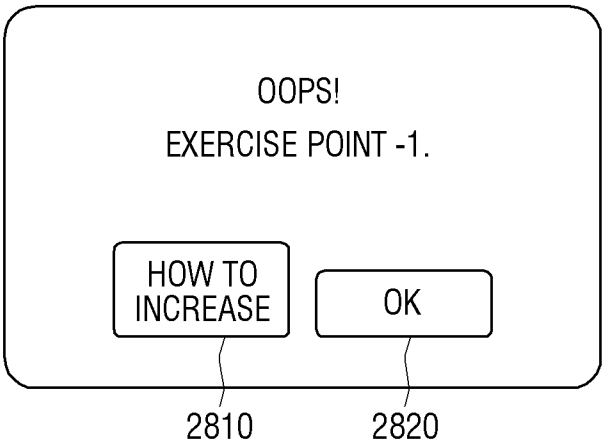


FIG. 29

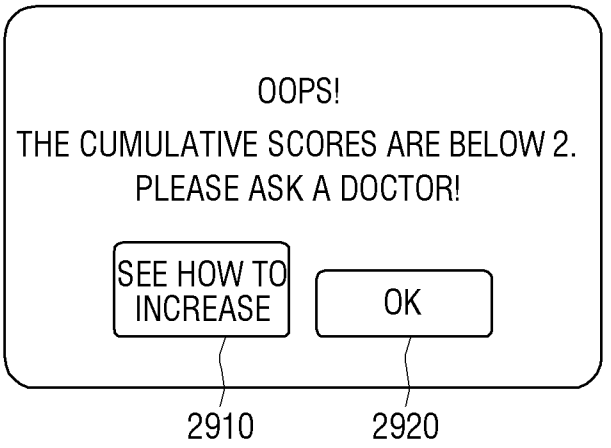

OOPS!
THE CUMULATIVE SCORES ARE BELOW 2.
PLEASE ASK A DOCTOR!
SEE HOW TO INCREASE
OK
2910
2920

FIG. 30

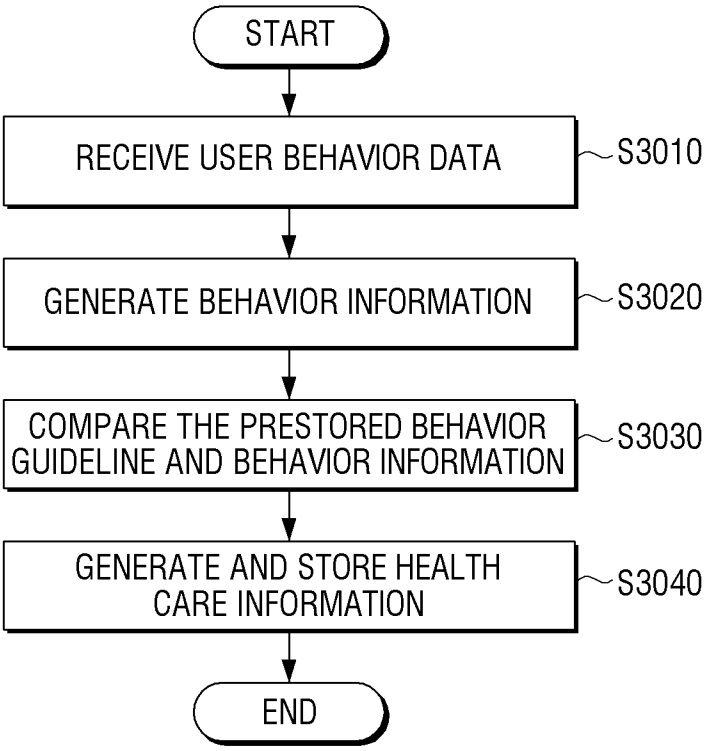

START
RECEIVE USER BEHAVIOR DATA
S3010
GENERATE BEHAVIOR INFORMATION
S3020
COMPARE THE PRESTORED BEHAVIOR GUIDELINE AND BEHAVIOR INFORMATION
S3030
GENERATE AND STORE HEALTH CARE INFORMATION
S3040
END

FIG. 31

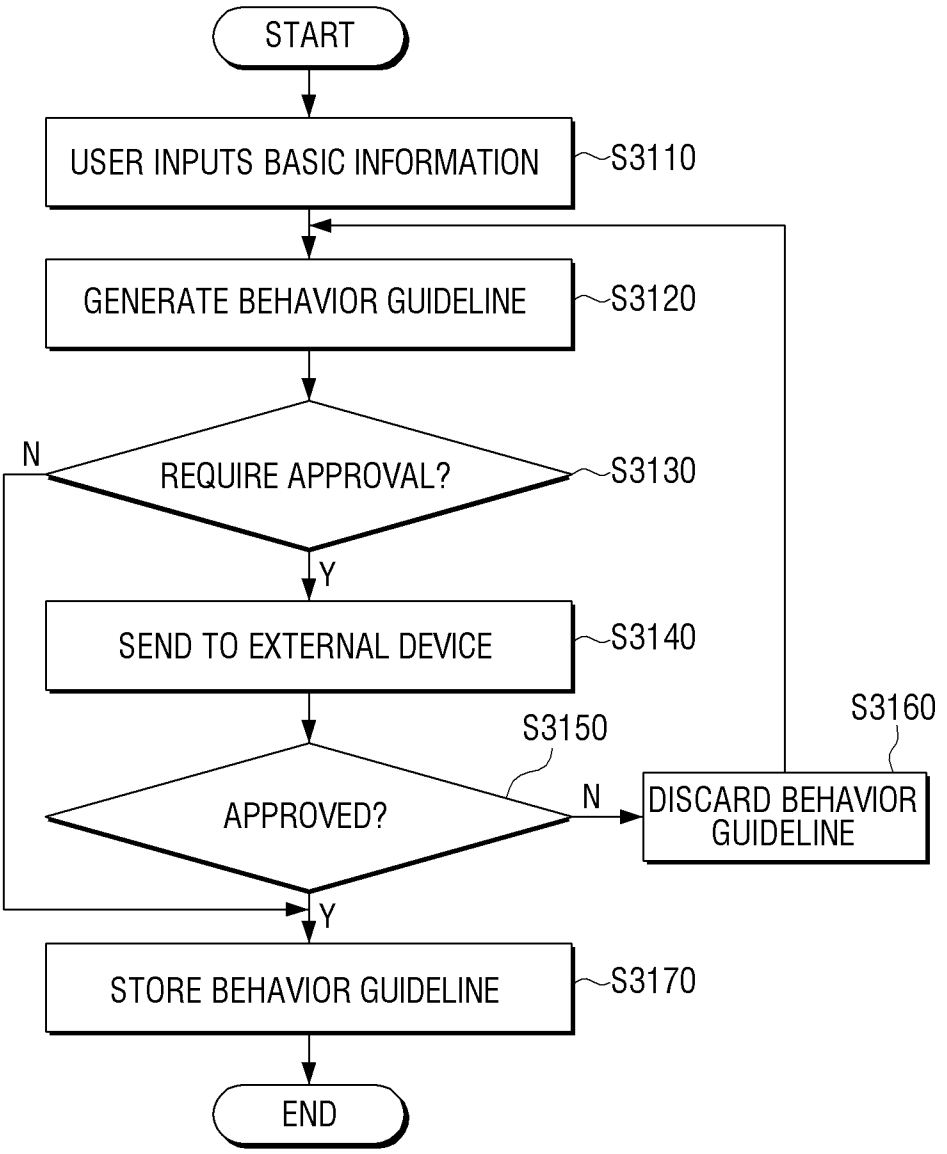

START
USER INPUTS BASIC INFORMATION
S3110
GENERATE BEHAVIOR GUIDELINE
S3120
REQUIRE APPROVAL?
S3130
N
Y
SEND TO EXTERNAL DEVICE
S3140
S3150
APPROVED?
N
S3160
DISCARD BEHAVIOR GUIDELINE
Y
STORE BEHAVIOR GUIDELINE
S3170
END

FIG. 32

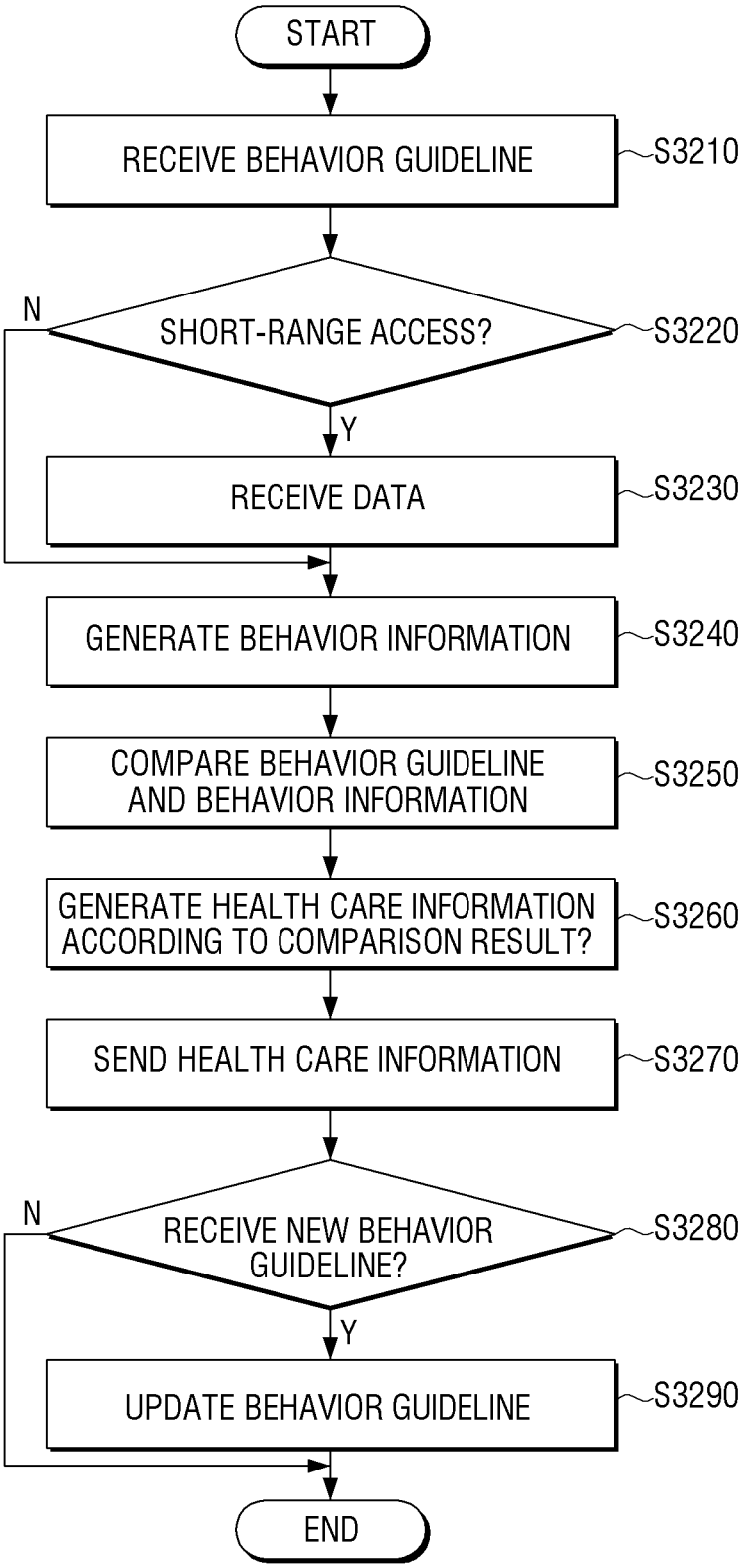

START
RECEIVE BEHAVIOR GUIDELINE
S3210
SHORT-RANGE ACCESS?
S3220
N
Y
RECEIVE DATA
S3230
GENERATE BEHAVIOR INFORMATION
S3240
COMPARE BEHAVIOR GUIDELINE AND BEHAVIOR INFORMATION
S3250
GENERATE HEALTH CARE INFORMATION ACCORDING TO COMPARISON RESULT?
S3260
SEND HEALTH CARE INFORMATION
S3270
RECEIVE NEW BEHAVIOR GUIDELINE?
S3280
N
Y
UPDATE BEHAVIOR GUIDELINE
S3290
END

FIG. 33

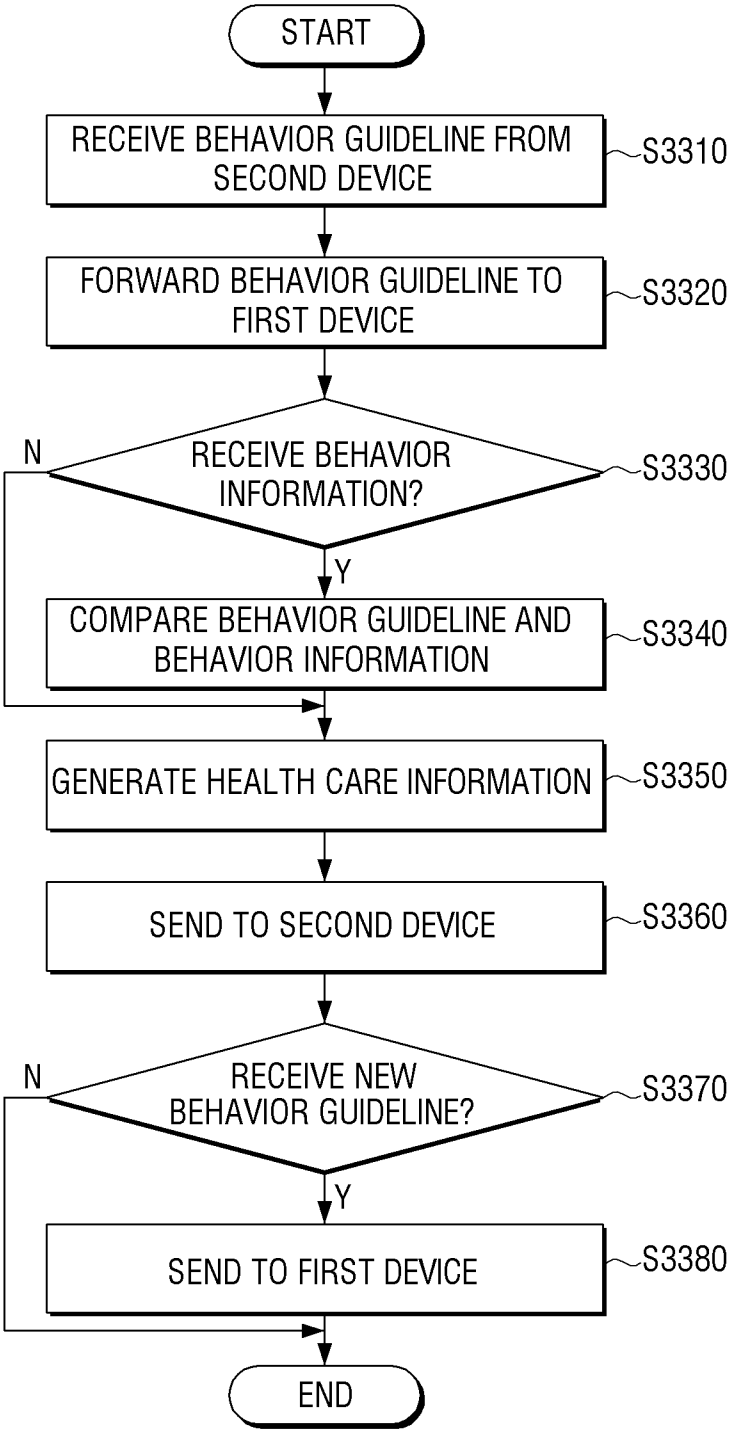

START
RECEIVE BEHAVIOR GUIDELINE FROM SECOND DEVICE
S3310
FORWARD BEHAVIOR GUIDELINE TO FIRST DEVICE
S3320
RECEIVE BEHAVIOR INFORMATION?
S3330
N
Y
COMPARE BEHAVIOR GUIDELINE AND BEHAVIOR INFORMATION
S3340
GENERATE HEALTH CARE INFORMATION
S3350
SEND TO SECOND DEVICE
S3360
RECEIVE NEW BEHAVIOR GUIDELINE?
S3370
N
Y
SEND TO FIRST DEVICE
S3380
END

FIG. 34

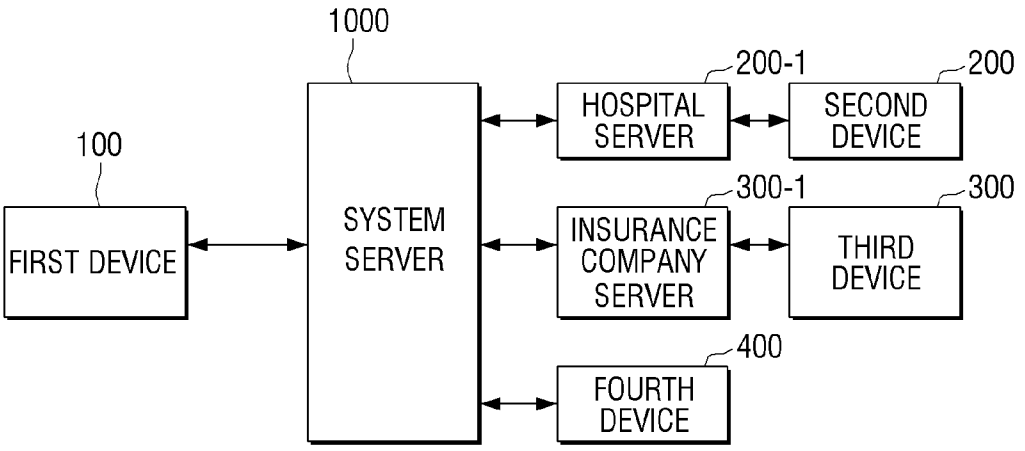

1000
100
FIRST DEVICE
SYSTEM SERVER
200-1
HOSPITAL SERVER
200
SECOND DEVICE
300-1
INSURANCE COMPANY SERVER
300
THIRD DEVICE
400
FOURTH DEVICE

FIG. 35

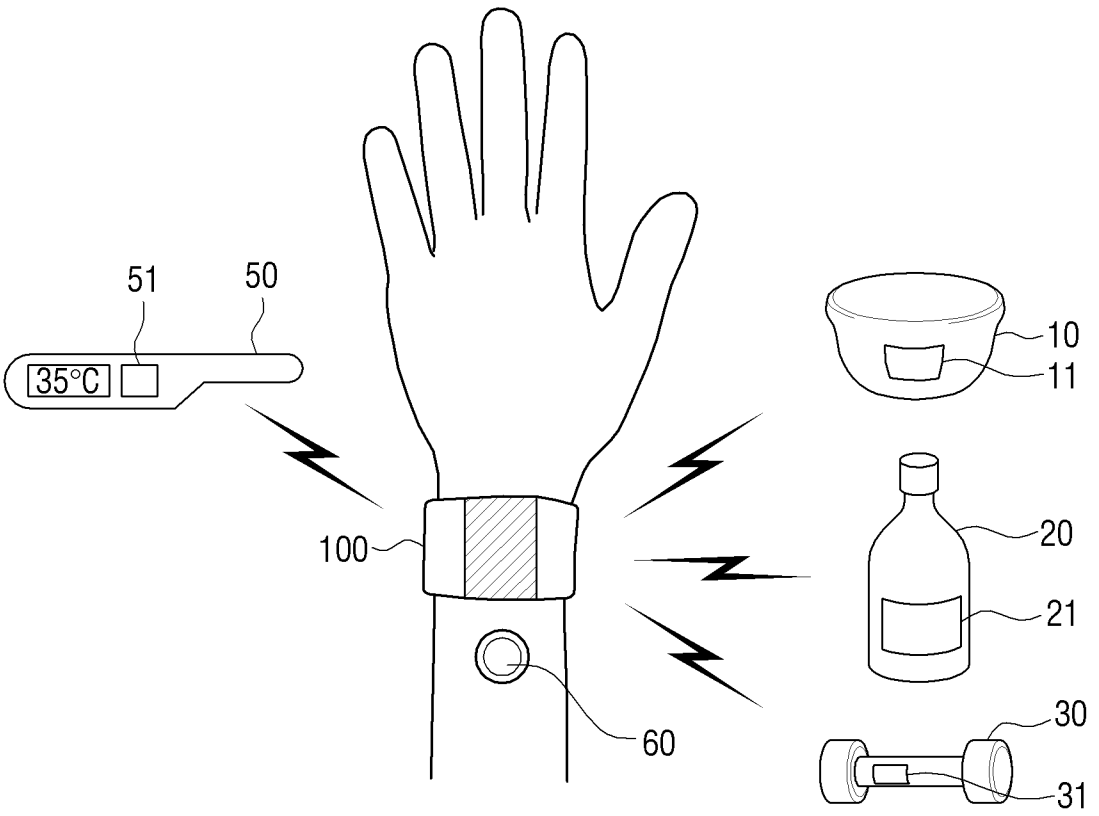


FIG. 36

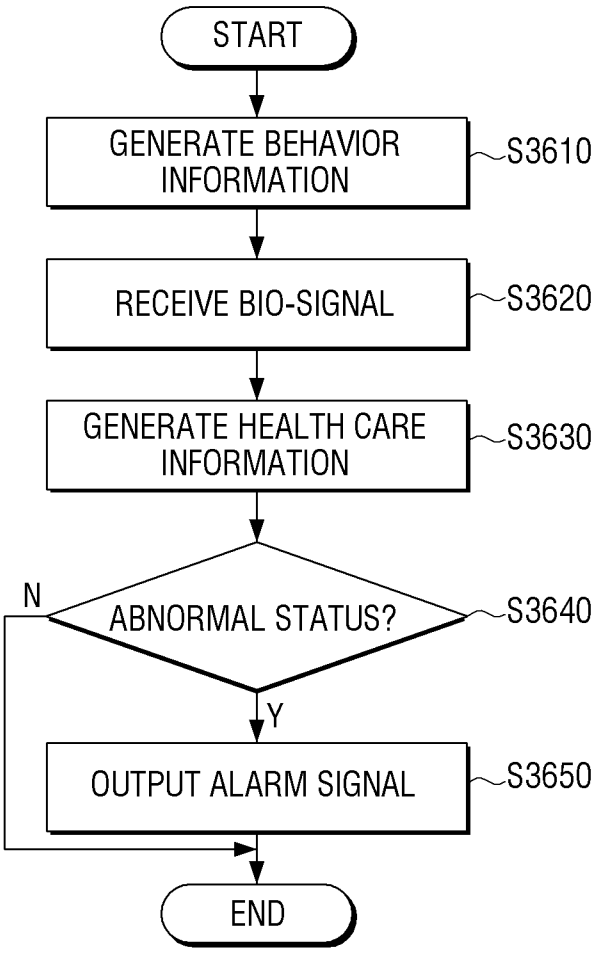

START
GENERATE BEHAVIOR INFORMATION
S3610
RECEIVE BIO-SIGNAL
S3620
GENERATE HEALTH CARE INFORMATION
S3630
ABNORMAL STATUS?
S3640
N
Y
OUTPUT ALARM SIGNAL
S3650
END

FIG. 37

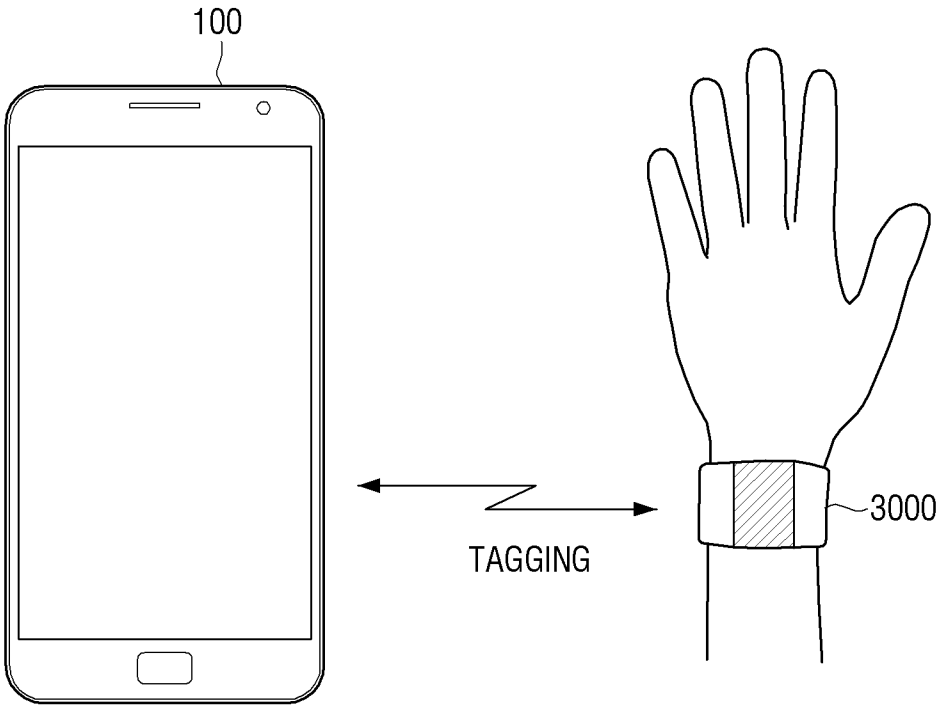


FIG. 38

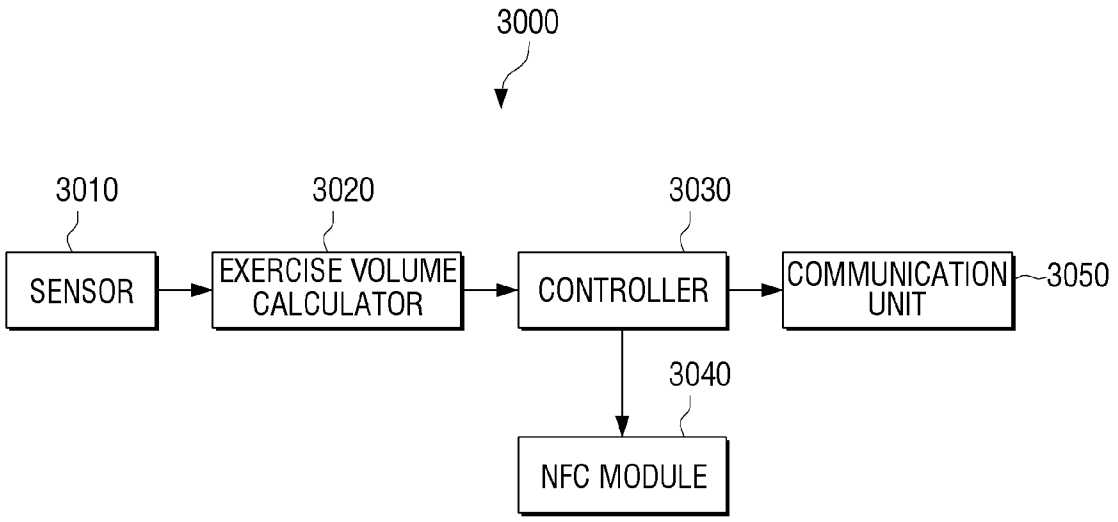

3000
3010
SENSOR
3020
EXERCISE VOLUME CALCULATOR
3030
CONTROLLER
COMMUNICATION UNIT
3050
3040
NFC MODULE

FIG. 39

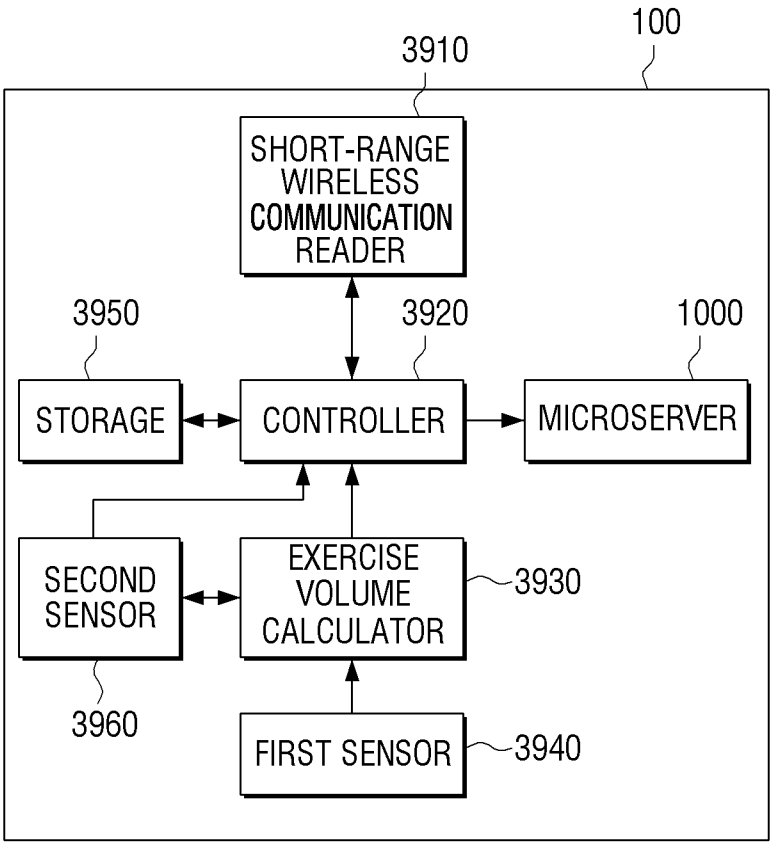

100
3910
SHORT-RANGE WIRELESS COMMUNICATION READER
3950
3920
1000
STORAGE
CONTROLLER
MICROSERVER
SECOND SENSOR
EXERCISE VOLUME CALCULATOR
3930
3960
FIRST SENSOR
3940

FIG. 40

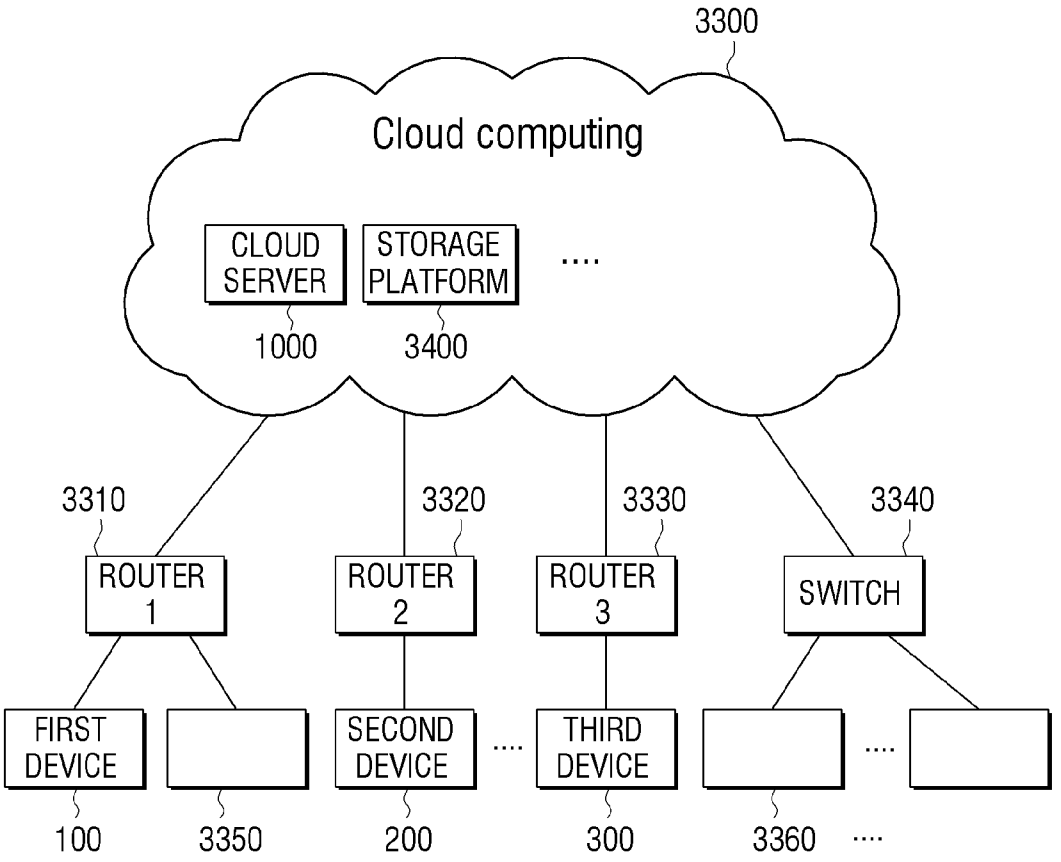

3300
Cloud computing
CLOUD SERVER
STORAGE PLATFORM
....
1000
3400
3310
3320
3330
3340
ROUTER 1
ROUTER 2
ROUTER 3
SWITCH
FIRST DEVICE
SECOND DEVICE
....
THIRD DEVICE
....
100
3350
200
300
3360
....

FIG. 41

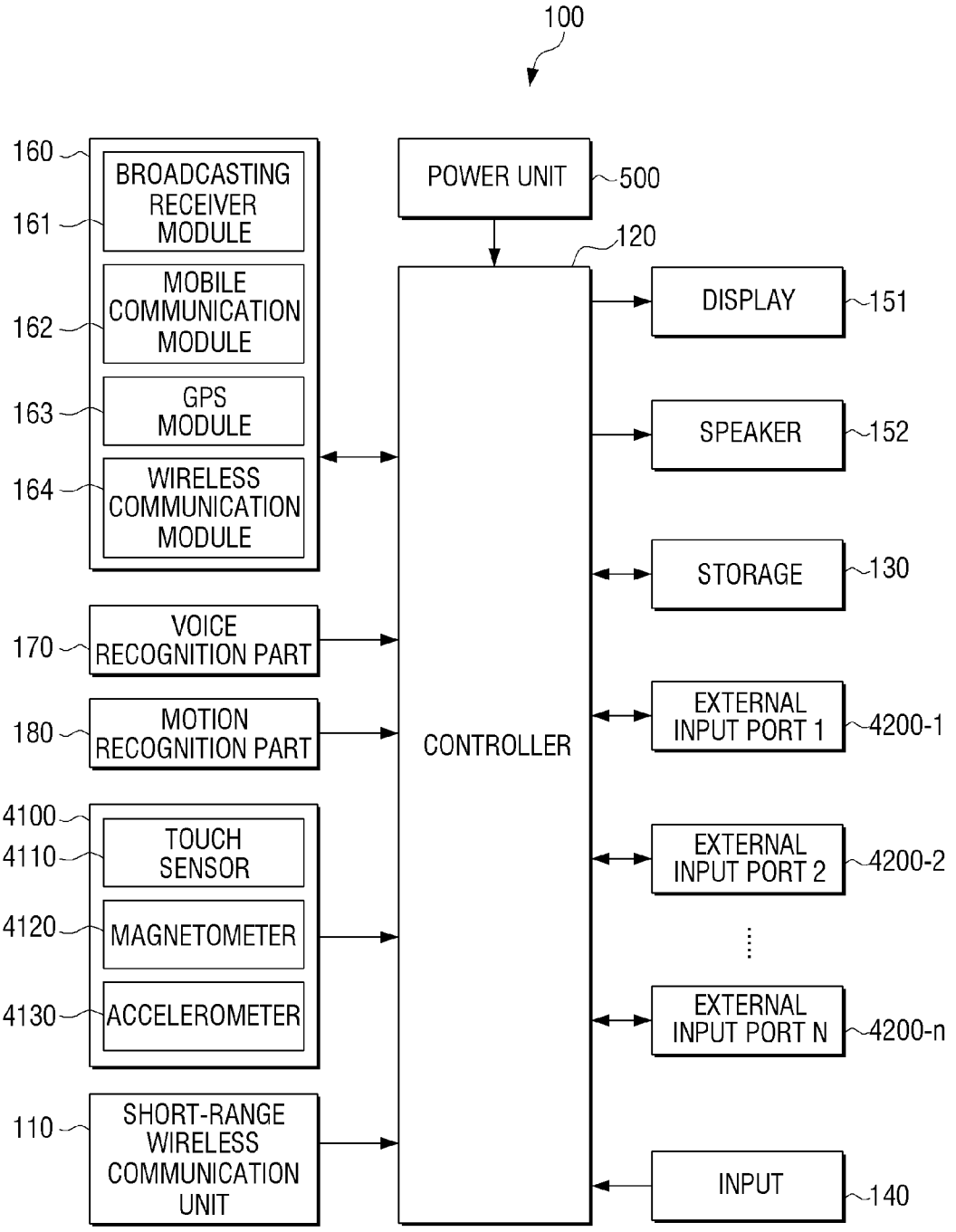

100
160
BROADCASTING RECEIVER MODULE
161
MOBILE COMMUNICATION MODULE
162
GPS MODULE
163
WIRELESS COMMUNICATION MODULE
164
VOICE RECOGNITION PART
170
MOTION RECOGNITION PART
180
4100
TOUCH SENSOR
4110
MAGNETOMETER
4120
ACCELEROMETER
4130
SHORT-RANGE WIRELESS COMMUNICATION UNIT
110
POWER UNIT
500
120
CONTROLLER
DISPLAY
151
SPEAKER
152
STORAGE
130
EXTERNAL INPUT PORT 1
4200-1
EXTERNAL INPUT PORT 2
4200-2
EXTERNAL INPUT PORT N
4200-n
INPUT
140

FIG. 42

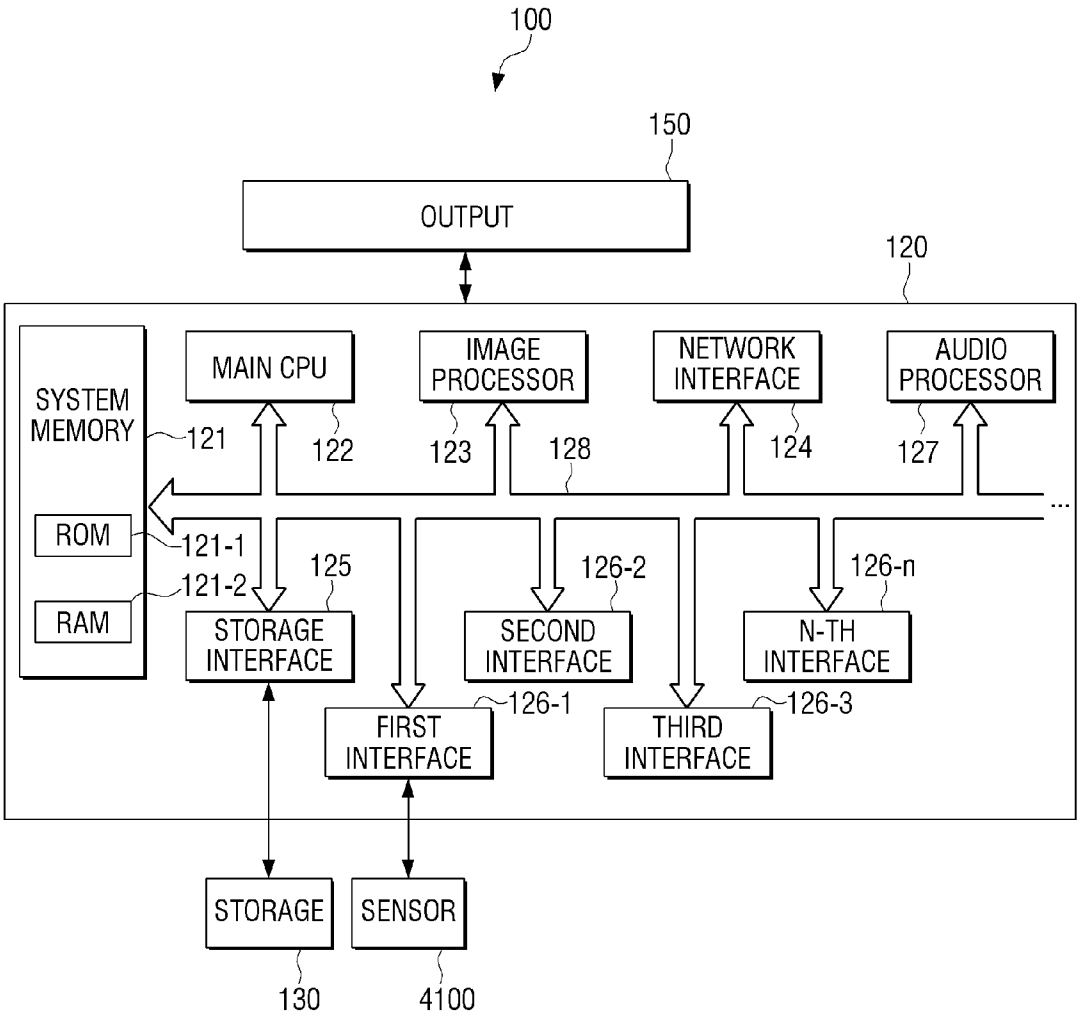
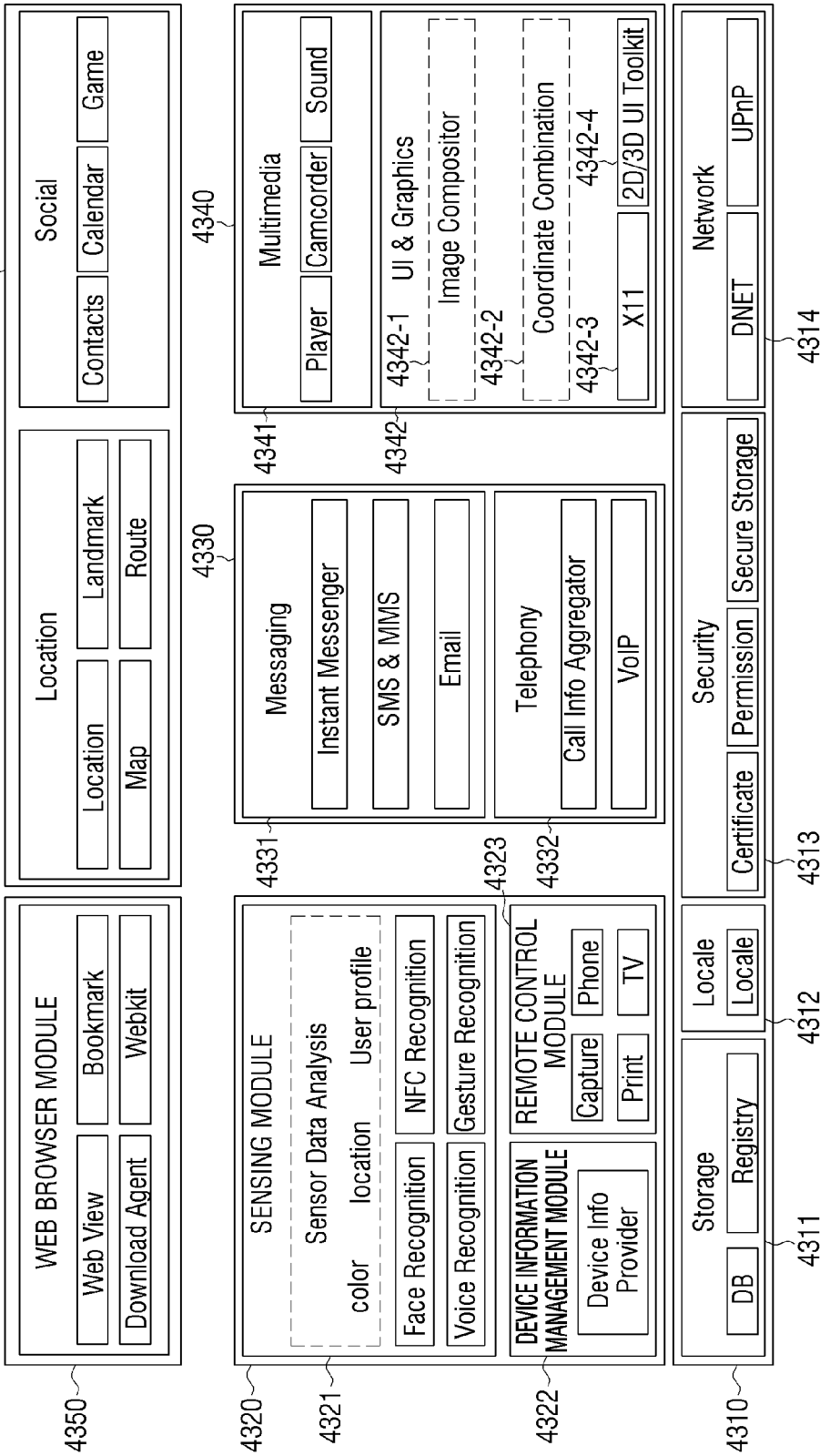

100
150
OUTPUT
120
SYSTEM MEMORY
121
MAIN CPU
122
IMAGE PROCESSOR
123
128
NETWORK INTERFACE
124
AUDIO PROCESSOR
127
ROM
121-1
RAM
121-2
125
STORAGE INTERFACE
126-2
SECOND INTERFACE
126-n
N-TH INTERFACE
FIRST INTERFACE
126-1
THIRD INTERFACE
126-3
STORAGE
130
SENSOR
4100

FIG. 43


4360
Social
Contacts
Calendar
Game
Location
Location
Landmark
Map
Route
4340
Multimedia
Player
Camcorder
Sound
4341
4342-1 UI & Graphics
Image Compositor
4342-2
Coordinate Combination
4342-3
4342-4
X11
2D/3D UI Toolkit
4342
4330
Messaging
Instant Messenger
SMS & MMS
Email
Telephony
Call Info Aggregator
VoIP
4331
4332
4323
WEB BROWSER MODULE
Web View
Bookmark
Download Agent
Webkit
SENSING MODULE
Sensor Data Analysis
color location User profile
Face Recognition
NFC Recognition
Voice Recognition
Gesture Recognition
DEVICE INFORMATION MANAGEMENT MODULE
Device Info Provider
REMOTE CONTROL MODULE
Capture
Phone
Print
TV
Storage
DB
Registry
Locale
Locale
Security
Certificate
Permission
Secure Storage
Network
DNET
UPnP
4350
4320
4321
4322
4310
4311
4312
4313
4314

USER TERMINAL DEVICE AND SYSTEM FOR PERFORMING USER CUSTOMIZED HEALTH MANAGEMENT, AND METHODS THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from Korean Patent Application No. 10-2012-0036465 filed on Apr. 8, 2012 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] 1. Field

[0003] Apparatuses, systems and methods consistent with exemplary embodiments relate to a terminal device and a health management system for user customized health care, and methods thereof, and more particularly, to a terminal device and a health management system for providing health care and health care recommendations using behavior guidelines of the user and behavior information of the user, and methods thereof.

[0004] 2. Description of the Related Art

[0005] Due to advances in medical technology, the human life span is increasing. To manage the health of people such as the elderly, the chronically ill, the obese, and patients with adult diseases, continuous health management is needed. For example, people with chronic conditions or illnesses such as high blood pressure or diabetes need constant health care to manage their condition.

[0006] However, people with these chronic conditions or illnesses generally treat their disease by taking drugs prescribed by a doctor over the long term, rather than receiving treatment in a hospital. In addition to medication, these diseases may be treated with exercise and diet. However, it is not always easy to manage the treatment of these conditions without additional help and information such as reminders and updated treatment

[0007] There has been a great increase in people who desire to maintain a healthy lifestyle by exercising and dieting to keep in shape, to stay healthy, and to prevent a disease.

[0008] The aging population, the increase of the chronically ill, and the increasing interest in a healthy lifestyle has created a need for personal healthcare management devices that provide customized user health management.

SUMMARY

[0009] One or more exemplary embodiments provide a user terminal device, a health management system, and a method for user customized health management so that the user can effectively care for his/her health.

[0010] According to an aspect of an exemplary embodiment, there is provided a user health management method including: receiving data from a data source using short-range wireless communication, the data indicating health-related information, determining health-related behavior information of a user based on the health-related information, generating a health care recommendation for the user based on the health-related behavior information, and outputting the health care recommendation.

[0011] The user health management method may also include receiving profile information including at least one of a weight, an age, a height, and a medical history of the user, generating and setting a behavior guideline based on the profile information. The generating the health care recommendation for the user based on the health-related behavior information may further include evaluating the health-related behavior information based on the behavior guideline.

[0012] The generating a health care recommendation for the user based on the health-related behavior information may further include determining an evaluation score based on the evaluating the health-related behavior information.

[0013] The determining the evaluation score based on the evaluating the health-related behavior information may include adding positive points or a first score to the evaluation score if the health-related behavior information satisfies the behavior guideline; and adding negative points or a second score lower than the first score to the evaluation score if the health-related behavior information does not satisfy the behavior guideline.

[0014] The generating the health care recommendation for the user based on the health-related behavior information may further include: determining whether the evaluation score is greater than or equal to a predetermined threshold and generating an adjusted behavior guideline based on a result of the determining whether the evaluation score is greater than or equal to the predetermined threshold.

[0015] The generating the adjusted behavior guideline may include increasing an intensity of the behavior guideline if the evaluation score is greater than or equal to the predetermined threshold and decreasing the intensity of the behavior guideline if the evaluation score is not greater than or equal to the predetermined threshold.

[0016] The profile information may be received from at least one of the user, another user, or an external device.

[0017] The health care recommendation may include a new behavior guideline for the user.

[0018] The new behavior guideline may be a temporary behavior guideline requiring approval.

[0019] The user health management method may further include transmitting the new behavior guideline to a second device of another user authorized to provide the approval and receiving the approval corresponding to the transmitted new behavior guideline from the second device. The outputting the health care recommendation may further include outputting the new behavior guideline after receiving the approval.

[0020] The data source may be a tag attached to an object.

[0021] The short-range wireless communication may include at least one of near field communication, reading a barcode, reading a Quick Response code, Wi-Fi communication and Zigbee communication.

[0022] The outputting the health care recommendation may further include outputting at least one of a graph based on the health-related behavior information, a notification based on the health-related behavior information, and an evaluation score based on the health-related behavior information.

[0023] The data source may be an external sensor which monitors at least one of weight, body temperature, heart rate, blood pressure, blood sugar, speed, acceleration, and movement of the user.

[0024] According to an aspect of another exemplary embodiment, there is provided a non-transitory computer readable medium having recorded thereon computer executable instructions that are executed by a computer to perform the user health management method.

[0025] According to an aspect of another exemplary embodiment, there is provided a user health management

device including: a short-range wireless communication device which receives data from a data source using short-range wireless communication, the data indicating health-related information; and a controller which determines health-related behavior information of a user based on the health-related information, generates a health care recommendation for the user based on the health-related behavior information, and outputs the health care recommendation.

[0026] The user health management device may also include an input which receives profile information including at least one of a weight, an age, a height, and a medical history of the user. The controller may generate and set a behavior guideline based on the profile information, and generate the health care recommendation by evaluating the health-related behavior information based on the behavior guideline.

[0027] The controller may generate the health care recommendation by determining an evaluation score based on the evaluating.

[0028] The controller may determine the evaluation score based by adding one of positive points or a first score to the evaluation score if the health-related behavior information satisfies the behavior guideline, and adding one of negative points or a second score lower than the first score to the evaluation score if the health-related behavior information does not satisfy the behavior guideline.

[0029] The controller may determine whether the evaluation score is greater than or equal to a predetermined threshold and generate an adjusted behavior guideline based on the determining whether the evaluation score is greater than or equal to the predetermined threshold.

[0030] The controller may generate an adjusted behavior guideline that increases an intensity of the behavior guideline if the evaluation score is greater than or equal to the predetermined threshold, and generate an adjusted behavior guideline that decreases the intensity of the behavior guideline if the evaluation score is not greater than or equal to the predetermined threshold.

[0031] The input may receive the profile information from at least one of the user, a second user, or an external device.

[0032] The health care recommendation may include a new behavior guideline for the user.

[0033] The new behavior guideline may include a temporary behavior guideline requiring approval.

[0034] The controller may transmit the new behavior guideline to a second device of a second user authorized to provide the approval, receive the approval corresponding to the transmitted new behavior guideline from the second device, and output the health care recommendation including the new behavior guideline in response to receiving the approval.

[0035] The data source may be a tag attached to an object.

[0036] The short-range wireless communication may be at least one of near field communication, reading a barcode, reading a Quick Response code, Wi-Fi communication and Zigbee communication.

[0037] The user health management device may also include a display which displays the health care recommendation. The health care recommendation may be at least one of a graph, a notification, and an evaluation score.

[0038] The short-range wireless communication device may receive data from an external sensor which monitors at least one of weight, body temperature, heart rate, blood pressure, blood sugar, speed, acceleration, g-force and movement of the user.

[0039] The short-range wireless communication device may receive data from a plurality of external sensors forming a personal area network.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0040] These and/or other aspects and advantages of the present general inventive concept will become apparent and more readily appreciated from the following description of the exemplary embodiments, taken in conjunction with the accompanying drawings of which:

[0041] FIG. **1** is a diagram of a health management system according to an exemplary embodiment;

[0042] FIG. **2** is a block diagram of a user terminal device according to an exemplary embodiment;

[0043] FIG. **3** is a diagram of a method for collecting data of an external object in the user terminal device according to an exemplary embodiment;

[0044] FIG. **4** is a diagram of a method of the user terminal device for updating behavior information and health care information by tagging with the external object according to an exemplary embodiment;

[0045] FIG. **5** is a block diagram of a system server according to an exemplary embodiment;

[0046] FIGS. **6** through **12** are diagrams of operations of the health management system according to various exemplary embodiments;

[0047] FIG. **13** is a block diagram of a user terminal device according to another exemplary embodiment;

[0048] FIG. **14** is a diagram of an input screen for inputting user's basic information;

[0049] FIG. **15** is a diagram of a behavior guideline input screen displayed to input a behavior guideline;

[0050] FIG. **16** is a diagram of a screen displayed to modify the user's behavior guideline;

[0051] FIG. **17** is a diagram of a screen for checking user's health care information;

[0052] FIGS. **18** through **29** are diagrams of various screens displayed in the user terminal device;

[0053] FIG. **30** is a flowchart of a user customized health management method of the user terminal device according to an exemplary embodiment;

[0054] FIG. **31** is a flowchart of a method for setting the behavior guideline;

[0055] FIG. **32** is a flowchart of a method for receiving from a second device and storing or updating the behavior guideline;

[0056] FIG. **33** is a flowchart of a user customized health management method of the system server according to an exemplary embodiment;

[0057] FIG. **34** is a diagram of a health management system according to another exemplary embodiment;

[0058] FIG. **35** is a diagram of a method for generating behavior information in the user terminal device according to another exemplary embodiment;

[0059] FIG. **36** is a diagram of a method for informing of a user's status using health care information in the user terminal device according to another exemplary embodiment;

[0060] FIG. **37** is a diagram of a method for collecting data from an information collector using the user terminal device which is implemented using a mobile phone;

[0061] FIG. **38** is a block diagram of the information collector which provides sensing information to the user terminal device;

[0062] FIG. **39** is a block diagram of a user terminal device including a sensor and a microserver therein;

[0063] FIG. **40** is a diagram of a system including the system server which is implemented using a cloud server;

[0064] FIG. **41** is a block diagram of a first device according to an exemplary embodiment;

[0065] FIG. **42** is a detailed block diagram of a controller; and

[0066] FIG. **43** is a diagram of software architecture stored in the first device.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0067] Exemplary embodiments will be described in detail with reference to the accompanying drawings, wherein like reference numerals refer to the like elements throughout.

[0068] FIG. **1** is a diagram of a health management system according to an exemplary embodiment. Referring to FIG. **1**, the health management system includes a first device **100**, a system server **1000**, a second device **200**, and a third device **300** through an n-th device n.

[0069] The first device **100** can generate behavior information by collecting data relating to a behavior of a user. The behavior information can be generated for various items such as drug administration, exercise, and living environment etc. The behavior information can be processed in real time, or generated at regular intervals.

[0070] The system server **1000** provides a user customized health management service to a user of the first device **100** according to various information collected and transmitted by the first device **100**. In this case, the system server **1000** can provide the user customized health management service in association with the second device **200**, the third device **300**, and the n-th device n.

[0071] In detail, the system of FIG. **1** establishes the behavior guideline (e.g., a health care recommendation) appropriate to the user, determines whether the user's actual behavior meets the behavior guideline, and generates health care information (e.g., a new health care recommendation) based on the determination. The health care information may be a new behavior guideline modified from a previous behavior guideline according to the user's behavior, and feedback information including an evaluation score by determining whether the behavior guideline and the behavior information match. The evaluation score can be determined based on various types of information that are scored and used to assign points such as life habit points and body part points, and that are accumulated and totaled. The life habit points score various habits in the user's daily lives, such as a user's eating habits, exercise habits, sleep habits, drinking habits, and smoking habits, etc. For example, life habit points can be added or subtracted based on the calorie count of a meal, the number of meals, and irregular meal times. Additionally, low scores or high scores may be assigned according to the habits of users. When the user eats the normal meal amount at a fixed meal time, positive point can be added and a high score corresponding to eating habits may be assigned. For unhealthy habits such as drinking alcohol or smoking, low scores may be assigned to the user or negative points may be given to a user. When a smoker quits smoking, positive points may be added in proportion to a period of time in which the user does not smoke. The body part points are scores assigned to a good behavior and a bad behavior corresponding to a body part of the user. The body part may be classified as external body parts such as skin, lower body, abdomen, and head of the user, and as various internal organs such as heart, lung and brain. For example, when the smoking behavior is detected, negative points can be added to the point total of the stomach or the liver, or a low score may be assigned to the point total of the stomach and liver. When the smoking is continued, a low score can be assigned to the organ such as lungs or a cumulative score can be subtracted. When the same drug is taken for a long time causing harm a particular organ, a low score can be given to the corresponding organ. In this case, a supervisor such as doctor can check the body part score and take an appropriate action such as modifying the prescription.

[0072] In a case in which there is a prescription relating to the user's behavior information, the user's behavior is scored by taking into consideration the health effects of the prescription on the other items corresponding of the user's behavior information. In contrast, when there is no prescription relating to the user's behavior information, the user's behavior is scored based on behavior guidelines defining exercise, food, medication, and environmental standards corresponding to the user without taking into consideration the effects of the prescription. Accordingly, various feedback may be provided based on the health care information so as to allow users to continuously manage their health.

[0073] The behavior guidelines may include at least one of a first behavior guideline effective with an external expert's approval, and a second behavior guideline effective without the approval. For example, the first behavior guideline can include a prescription, and the second behavior guideline can include at least one of a food intake manner, a diet, an exercise method, an exercise volume, an exercise time, and a sleeping time.

[0074] The behavior guideline can include a long-term behavior guideline and a short-term behavior guideline. Herein, the short-term behavior guideline can be a shorter term behavior guideline which is specified as part of the long-term behavior guideline. For example, the short-term behavior guideline can be defined in detail with respect to one or more of a medication, eating habits, exercise habits, and life habits. The long-term behavior guideline may be a goal that is set to be reached over a longer period of time than the period of time set for short term behavior guidelines. A long-term behavior guideline may correspond to the weight of the user, a fitness level, a cure for a disease, and maintaining an exercise pattern or goal.

[0075] For example, when the long-term behavior guideline corresponds to exercise, exercising regularly over long period of time increases a long-term goal value. However, when the user neglects to exercise for a long period of time, this may decrease long term goal value and other guidelines to replace exercise may be suggested.

[0076] When the long-term behavior guideline is directed to curing a disease, the short-term behavior guideline may define what steps to take and how to perform the steps over a certain period of time in order to treat the disease. When the long-term behavior guideline is directed to fitness such as a weight loss goal, the short-term behavior guideline can determine short term weight-loss goals within the long-term weight loss by stages and define a calorie intake and an exercise volume to achieve the goal per stage.

[0077] When the user's behavior information is not input, the long-term behavior guideline can be established based on user's health information or other basic information of the user which is input by the user or a supervisor. Alternatively,

when the behavior information is input, the long-term behavior guideline can be established according to a predefined algorithm based on the cumulative point totals of the behavior information. The user's basic information, behavior information, or cumulative point total can be transmitted to an external device so that the external device can establish and send the behavior guideline. For example, the long-term behavior guideline can include a prescription for the long-term treatment of a disease, an exercise plan, and a daily schedule chart, and the short-term behavior guideline can include a prescription for the short-term administration and a short-term diet plan chart.

[0078] Such behavior guidelines may be diverse, and the health management service appropriate to the user can be provided according to the behavior guideline. The behavior guidelines can be prioritized according to their importance. For example, the administration of a prescription can be given a first priority, the exercise method can be given a second priority, and the food intake manner can be given a third priority. The behavior guidelines may be generated sequentially according to their priority.

[0079] To provide the user customized health management service, the first device **100**, the system server **1000**, the second device **200**, and the third device **300** of the system of FIG. **1** can work together. Detailed operations of the devices can be implemented differently according to various exemplary embodiments, to be explained. Alternatively, in addition to the system of FIG. **1**, a single device may manage the user's health by itself.

[0080] To collect the data about the user's behavior, the first device **100** can be implemented using a terminal device of the user. In detail, the first device **100** can be implemented using a variety of portable devices such as mobile phone, personal digital assistant (PDA), tablet, personal computer (PC), MP3 player, and a calorie tracker. The first device **100** may be implemented using a wearable watch or a bracelet of the user. The first device **100** can collect the data in various manners.

[0081] For example, the first device **100** can collect the data using a short-range wireless communication method. In this case, the first device **100** can include a short-range wireless communication reader (e.g., short-range wireless communication device). Accordingly, the first device **100** can read the data by accessing an external object attached with a short-range wireless communication tag that is near the device. The short-range access works by moving at least one of the short-range wireless communication tag and reader to a location near the other causing the reader and the tag to within a communication range. This may be referred to as tagging. While in the communication range, the short-range wireless communication reader can read information recorded in the short-range wireless communication tag.

[0082] The short-range wireless communication method can include Near Field Communication (NFC). The NFC is a contactless short-range wireless communication technology using a frequency band of 13.56 MHz. Using NFC, data can be transmitted and received when one or more terminals approach a tag or each other, for example, within 10 cm or so. The short-range wireless communication method may also use, for example, barcode readers, Quick Response (QR) code readers, Wi-Fi, Zigbee, and Bluetooth, etc.

[0083] The collected data can relate to various user behaviors such as medication, food intake, exercise, and sleep. The data collection according to the short-range wireless communication method and the prediction of the user behavior using the collected data will be described in detail.

[0084] The user may directly input the data into the first device **100**. For example, when the first device **100** includes an input means such as touch screen, touch pad, and/or button or is connected to an input means such as remote control, keyboard, and/or mouse, the user can directly input the data using such an input means. The input data reflects the user's actual behavior.

[0085] The user may connect an external storage medium such as a Universal Serial Bus (USB) memory device or a memory card to the first device **100** and send data stored in the external storage medium to the first device **100**.

[0086] Alternatively, the user may connect other terminal devices such as a PC, laptop computer, tablet, and mobile phone to the first device **100** and send data to the first device **100** using the connected terminal device. As such, the first device **100** can collect various data relating to the user's behavior from various input devices.

[0087] FIG. **2** is a block diagram of the first device **100** using the short-range wireless communication scheme according to an exemplary embodiment. In detail, the first device **100** is implemented using a user terminal device. Referring to FIG. **2**, the first device **100** includes a short-range wireless communication reader **110**, a controller **120**, and storage **130**.

[0088] When accessing external objects including a short-range wireless communication tag in the short range, the short-range wireless communication reader **110** reads and provides information recorded in the tag to the controller **120**. The short-range wireless communication reader **110** can include a Radio Frequency (RF) module and an antenna coil. The short-range wireless communication reader **110** emits electromagnetic waves through the antenna coil. Hence, currents are induced by electromagnetic inductions in the short-range wireless communication tag (not shown) attached to the external object within an electromagnetic wave propagation distance based on the electromagnetic waves emitted from the first device **100**. Thus, an integrated circuit in the short-range wireless communication tag is driven to send an RF signal including the stored data. The RF module in the short-range wireless communication reader **110** receives the RF signal through the antenna coil, demodulates and decodes the received RF signal, and detects the data in the RF signal. While only the short-range wireless communication reader **110** is depicted in FIG. **2**, the first device **100** may include, if necessary, a short-range wireless communication module including the short-range wireless communication tag.

[0089] The controller **120** generates the user behavior information using the detected data. In this case, the behavior information can be generated by estimating the user's behavior according to the collected data. For example, when the short-range wireless communication tag attached to a medicine bottle is accessed by the terminal device through short-range communication, drug information in the tag is detected. Upon detecting the drug information, the controller **120** can recognize the administration of the corresponding drug and store the behavior information together with the administration time and the drug name. When the short-range wireless communication tag attached to a food container is accessed by the terminal device through short-range communication, the controller **120** can recognize the intake of the corresponding food. When the food container is a rice bowl, the controller **120** can recognize the intake of the meal corresponding to

a size of the rice bowl, the calorie count of the rice bowl, and store the behavior information together with the meal time, the food type, and the intake quantity. The detected behavior information may be modified by a user according to the user's actual intake.

[0090] FIG. **3** is a diagram of a method for collecting data to generate the behavior information. Referring to FIG. **3**, the user can wear the first device **100** on his/her wrist. The user brings the first device **100** close to external objects **10** through **40** attached with short-range wireless communication tags **11** through **41**, and the first device **100** receives data recorded in the tags **11** through **41**. For example, when the first object **10** being a food container approaches, the controller **120** generates food intake information using the data received from the food container tag **11**. When the second object **20** being a medicine bottle approaches, the controller **120** generates medication information using data received from the medicine bottle tag **21**. When the third object **30** being exercise equipment or the fourth object **40** being a door or lock of the gym approaches, the controller **120** generates exercise information using the data from exercise equipment tag **31** and gym door tag **41**. The behavior information includes the generated food intake information, medication information, exercise information.

[0091] In addition to the data obtained using the short-range wireless communication, information added by the user can be included in the generation of the behavior information. For example, when the device of the user communicates with a tag of an object by mistake and the data is received, the controller **120** can output a message asking whether the user actually has conducted the corresponding behavior. The user may confirm, reject, or modify the behavior corresponding to the message and the controller **120** may recognize the actual behavior of the user based upon the user's input and generate the behavior information.

[0092] The controller **120** stores the generated behavior information in the storage **130**. The controller **120** can store the behavior information by processing fields of the collected data into the storage format of the first device **100**. For example, when the size of the behavior information is greater than a bit size of a region allocated to record the behavior information in the storage **130**, the controller **120** stores the behavior information in the storage **130** by compressing the behavior information or by deleting obsolete behavior information. When the first device **100** cannot process the behavior information, the controller **120** can send the behavior to the system server **1000** or other external device, receive the data processed by the external device, and store the processed data in the storage **130**.

[0093] The storage **130** stores the behavior information together with pre-stored behavior guidelines. The controller **120** generates the health care information by comparing the stored behavior guideline and behavior information.

[0094] The behavior guideline may be input directly in the first device **100**, or transmitted to the first device **100** from the external device that is connected to the first device **100** and stored in the storage **130**. In this case, the first device **100** may further include an input (not shown) or a communication unit (not shown).

[0095] The behavior guideline may set according to various types of information corresponding to the user. For example, various behavior guidelines such as prescription medications, exercise plans, food intake plans, and life habits, etc. can be stored in the storage **130**.

[0096] The controller **120** can notify the user of a behavior guideline and provide information to encourage user compliance with the behavior guideline. For example, when the preset medication administration time or exercise time arrives, the controller **120** outputs a message notifying the user to administer the medication or exercise.

[0097] The controller **120** generates the health care information by comparing the behavior guideline stored in the storage **130** with the user behavior information. For example, when prescription administration is stored as the behavior guideline and drug information defined in the prescription is read by the short-range wireless communication reader **110** within a preset time, the controller **120** determines that the prescription has been administered normally according to the behavior guideline and generates the health care information indicating the user is complying with the prescription administration behavior guideline.

[0098] When the exercise plan is stored as the behavior guideline and the short-range wireless communication tag in the exercise equipment or the gym door is read by the short-range wireless communication reader **110**, the controller **120** determines that the user is complying with the exercise plan and generates the corresponding health care information.

[0099] For the food intake, the controller **120** can determine whether the user eats food as usual when the tag of a designated food container is read by the short-range wireless communication reader **110**, and record the determination result as the health care information. In addition to the food container, the short-range wireless communication tag may be attached to an entrance or a table of a restaurant to determine the meal time based on the user's presence at the restaurant and/or table. Alternatively, behavior information corresponding to food intake may be generated based on information read by a terminal device of second user such as guardian or caretaker.

[0100] With respect to the life habits, the controller **120** can determine when the user goes to sleep when a tag attached to bedding is read by the short-range wireless communication reader **110**, and determines that the user is awake when the tag attached to the bedding, an alarm clock, or a bathroom door is read by the short-range wireless communication reader **110**, and generates the corresponding health care information.

[0101] The controller **120** can generate as the health care information, feedback information generated according to evaluation score and scores based on the comparison of the behavior guideline and the behavior information. The feedback information can include a message notifying a user of the evaluation score, the number of feedbacks, and feedback intensity. For example, when the user conducts a behavior meeting the behavior guideline, a high score or positive points are added to the evaluation score. In this case, a compliment message can be generated as the feedback information. Alternatively, when the behavior of the user does not meet the behavior guideline, this yields a low evaluation score. In this case, a warning message, a number of warning message outputs, a warning sound volume, and a vibration intensity can be generated as the feedback information. That is, the feedback information can include the positive feedback and the negative feedback. The feedback information may be visual information in the form of a graph so that the user can easily check the health care information. Additionally, the feedback may be generated in the form of a request for an emergency rescue in the case that the evaluation score of the user are determined to require such action.

[0102] When a preset event arises, the controller **120** outputs a feedback signal according to the feedback information. For example, a positive feedback can output a vibration and music together with a complimentary message so as to feed the current status back to the user. The positive feedback event can occur if the accumulated evaluation score is greater than a certain value or the difference between the accumulated evaluation score and a previous evaluation score is greater than a certain value. Alternatively, negative feedback can output a vibration and a warning sound together with a warning message. The negative feedback event can occur, in one example, when the evaluation score of the health point per part is below a certain value or the difference from a previous evaluation score is greater than a certain value.

[0103] FIG. **4** is a diagram of a method for generating the health care information by calculating the evaluation score. Referring to FIG. **4**, when the tag of first object **10** being the food container is detected by the first device (S**410**), the first device **100** receives the data from the first object **10** and stores the food intake information (S**415**).

[0104] The device compares the received information of the food to the behavior guideline to determine if the food intake is normal (S**420**). For the normal food intake, the evaluation score 'a' is added to the previous evaluation score (S**425**). For the abnormal food intake, evaluation score 'b' is added to the evaluation score (S**430**).

[0105] The controller **120** generates and stores the health care information including the evaluation score in the storage **130** (S**435**). When the health care information of the corresponding user is generated, the controller **120** updates the health care information.

[0106] Additionally, when the second object **20** being the medicine bottle approaches (S**440**) is detected by the first device, the controller **120** generates and stores the medication information in the storage **130** by receiving the information of the second object **20** (S**445**).

[0107] The controller **120** determines whether the medication is the normal medication by comparing the received medicine information and the medicine information defined by the behavior guideline (S**450**). When the medication is determined to be abnormal, the controller **120** determines the abnormal medication and adds the evaluation score 'e' (S**460**). In contrast, when the medication is determined to be normal, the controller **120** determines whether the medication is administered at a proper administration time (S**455**). If the medication is determined to be administered within the proper administration time, the controller **120** adds evaluation score 'c' (S**465**). If the medication is determined to be administered outside of the proper administration time, the controller **120** adds the evaluation score 'd' (S**470**).

[0108] The evaluation scores a, b, c, d, and e can be set to appropriate values through repeated experiments. For example, the value 'c' given when the accurate medicine is administered at a correct time can be greater than the value 'd' given when the medicine is administered at the wrong time. The absolute values of 'b' and 'e' given for the abnormal food intake or the abnormal medication can be equal to the absolute values of 'a' and 'c.' While the evaluation score is calculated by adding the positive or negative value or each evaluation score in FIG. **4**, the evaluation score may be calculated merely with different positive values. In this case, the differences between 'a,' 'b,' 'c,' 'd,' and 'e' can be increased. Accordingly, when a fixed value is not accumulated during a preset time, the controller **120** can determine that the user's health is not being managed normally.

[0109] Upon receiving data by accessing the tags of various external objects, the controller **120** generates the behavior information according to the data and updates the health care information by comparing the behavior information and the behavior guideline (S**475**). The behavior information may be generated separately based on the data received from the external object, or may be the data itself that is received from the external object.

[0110] Alternatively, every time the data is received from the external object, the controller **120** may forward the data itself to the system server **1000** or other devices in real time. Hence, the user's behavior may be detected and the behavior information may be generated externally using the data.

[0111] While the behavior information relating to the food intake and the medication is explained in FIG. **4**, the behavior information can be generated corresponding to various items such as medication, exercise, and living environment. The behavior information can be generated to correspond to the behavior guideline.

[0112] That is, the behavior guideline can include drug information, exercise information, and environment information. The drug information can include information about drug name, effect, efficacy, effect, usage, dosage, ingredients, raw material, period of administration, storage method, cautions of administration, side effects, persons prohibited from taking the drug, persons cautioned about taking the drug, abnormal reaction, survey results after the product release, general directions, interactions with other drugs, and food not to be administered with the drug. The exercise information can include an exercise type, an exercise region, an exercise time, an exercise intensity, an exercise volume, and an exercise speed. The environment information can include temperature, humidity, pressure, and air noxious substances. The food intake information can include information about available food, food to avoid, meal time, intake quantity, nutritional information, and food intake manner.

[0113] The health care information stored in the first device **100** can be used for various functions.

[0114] As shown in FIG. **4**, when a preset event occurs (S**480**), the first device **100** can output the health care information using a visual message or an audio message (S**485**). That is, when the first device **100** includes a display (not shown) or a speaker (not shown), the controller **120** can display the health care information through the display or output the health care information as sound using the speaker.

[0115] Alternatively, when the first device **100** includes a communication unit, which is not shown in FIG. **4**, for communicating with an external device and a preset event takes place, the controller **120** may send the health care information to the external device. Herein, the external device can be the system server **1000** or the second device **200** through the n-th device n of FIG. **1**. The second device **200** through the n-th device n can include the user terminal device of a guardian, a user terminal device of a supervisor such as doctor, a hospital server, and an insurance company server.

[0116] The event can include various events such as an event where the user inputs a user command to the first device **100**, an event where the accumulated health care information meets a preset threshold condition, an event where a transmission request is received from the external device, and an event where a preset time period arrives. When the health care information includes the evaluation score, the threshold con-

dition can specify that the accumulated evaluation score reaches a preset threshold. Also, the event can include a user check signal for checking the evaluation score, or a check request input of the external device. Additionally, the health care information may be a new behavior guideline extracted according to the comparison between the behavior guideline and the behavior information.

[0117] While the first device **100** generates the behavior information and then generates and updates the health care information using the behavior information in FIG. **4**, the health care information can be generated and updated by the external device such as the system server **1000** and the second device **200** through the n-th device n. In this case, the first device **100** generates the behavior information based on the data received from the objects and then sends the generated behavior information to the external device. For example, the first device **100** can generate the behavior information corresponding to the medication when the medicine bottle information is collected, generate the behavior information of the corresponding food intake when the food container information is collected, and send the generated behavior information to the external device. The external device can compare the behavior guideline defined for the user of the first device **100** with the behavior information, and thus accumulate and manage the score corresponding to the comparison.

[0118] When comparing the behavior information and the behavior guideline and determining whether the behavior meets the behavior guideline over a certain period of time, the controller **120** can generate and store a revised behavior guideline in the storage **130**. For example, the controller **120** can establish a new behavior guideline to increase exercise volume.

[0119] Alternatively, the health care information may be a temporary behavior guideline determined according to the comparison between the behavior guideline and the behavior information. The controller **120** may get the approval of the external device by sending the temporary behavior guideline to the external device. That is, upon receiving the approval information of the temporary behavior guideline from the external device, the controller **120** replaces the behavior guideline stored in the storage **130** with the temporary behavior guideline.

[0120] Alternatively, various types of information generated by the first device **100** can be provided to the system server **1000** so that the system server **1000** can offer a user customized health service.

[0121] FIG. **5** is a block diagram of the system server **1000**. Referring to FIG. **5**, the system server **1000** includes a communication unit **1100**, a controller **1200**, and a storage **1300**.

[0122] The communication unit **1100** communicates with other devices in the system of FIG. **1**. The communication unit **1100** can receive the behavior guideline of the user of the first device **100** from the second device **200**. Herein, the user can be a user subscribed to the health management service. That is, the user can subscribe to the service online through a web page provided by the system server **1000** or the second device **200**, or offline by submitting an application.

[0123] The second device **200** can be a terminal device of the supervisor who is authorized to set the behavior guideline of the user. The supervisor can include a doctor, a nurse, a pharmacist, a health trainer, and a nutritionist.

[0124] The controller **1200** controls the communication unit **1100** to forward the behavior guideline received from the second device **200** to the first device **100**. Hence, the first device **100** can store the received behavior guideline. The first device **100** can generate the behavior information by collecting data relating to the user's behavior, and send the behavior information to the system server **1000**.

[0125] When receiving the behavior information through the communication unit **1100**, the controller **1200** generates the health care information by comparing the behavior information and the behavior guideline. That is, while the first device **100** itself generates the behavior guideline and the health care information in FIGS. **2** and **4**, the system server **1000** generates the health care information in this exemplary embodiment. The health care information generation of the controller **1200** is similar to that of FIG. **4** and thus shall be omitted here.

[0126] The controller **1200** stores the generated health care information in the storage **1300**. The controller **1200** sends the stored health care information to the second device **200**. The second device **200** generates the new behavior guideline by modifying the behavior guideline based on the user's health care information, and sends the generated new behavior guideline to the system server **1000**. For example, when the behavior guideline includes the prescription and the supervisor of the second device **200** determines that the user takes medicine steadily according to the prescription, he/she can generate the new behavior guideline by changing the medicine of the prescription, reducing the dosage and/or the administration time, or deleting the prescription.

[0127] Upon receiving the new behavior guideline, the controller **1200** controls the communication unit **1100** to forward the new behavior guideline to the first device **100**. The first device **100** replaces the pre-stored behavior guideline by the new behavior guideline.

[0128] The system server **1000** further includes an input (not shown) for directly receiving and sending the user's basic information to the second device **200**. Alternatively, the system server **1000** may receive the user's basic information from the first device **100**, that is, the user terminal device and forward the user's basic information to the second device **200**.

[0129] While the second device **200** generates the behavior guideline in FIG. **5**, the first device **100** or the system server **1000** may generate the behavior guideline, and generate and manage the health care information in various implementations.

[0130] Hereafter, the user customized health management method of the system according to various aspects of exemplary embodiments will be explained.

[0131] <The First Device Generates the Behavior Guideline>

[0132] Referring now to FIG. **6**, the user's basic information is input to the first device **100** (S**610**). The first device **100** can be implemented as the user terminal device of the user as described above. The basic information can include identification information such as a user's name, user ID, and resident registration number, characteristic information such as gender, age, weight, and height, and special information such as user medical history, therapy record, family anamnesis, physical constitution, and allergies.

[0133] A user such as a patient may directly input the basic information to the first device **100**, or information input by the doctor or other expert may be sent and input to the first device **100**. Alternatively, the basic information may be input using short-range wireless communication by reading a tag of an

external object such as an identification card or service membership card containing the user's basic information using the first device **100**.

[0134] The first device **100** can generate the behavior guideline based on the received information (S**615**).

[0135] The behavior guideline can include various guidelines corresponding to prescription medications, food intake manner, healthy diet, dietary menu, exercise plan, and daily diet schedule. The behavior guideline may be divided into a guideline requiring approval, and a guideline not requiring approval, that is, into a first behavior guideline effective upon the approval from another person such a doctor or supervisor and a second behavior guideline without the approval.

[0136] As an example of the behavior guideline requiring the approval, the prescription may be input to the first device **100** by downloading information prescribed by the doctor from the external device or by using a barcode or a QR code printed on the prescription, or an NFC tag attached to the prescription. The user may also view the prescription label and input the prescription information on the label to generate the behavior guideline. Such a behavior guideline can be set as the temporary behavior guideline.

[0137] As such, when the user can input the doctor's prescription user to the first device **100**, the external approval can be required to verify the prescription. Upon the external approval for the temporary behavior guideline, the generated behavior guideline is replaced by the temporary behavior guideline.

[0138] Alternatively, the behavior guideline that does not require approval can be input in various manners as described above. The behavior guideline without the approval may be automatically generated by the first device **100**. For example, as for the dietary menu or the exercise plan, the first device **100** can calculate a standard body weight and an obesity index using the weight and height information input by the user, and automatically calculate a weight loss goal corresponding to the obesity index. Hence, it is possible to determine a daily recommended caloric intake, an exercise volume a day, a recommended menu, and a recommended exercise volume corresponding to the weight loss goal from a pre-stored database. The database, which records optimal values obtained through a plurality of repeated experiments, can be pre-stored in the first device **100**.

[0139] Other behavior guidelines may be defined and input by the user in person using the first device **100**, or may be defined using another terminal device of the user, sent to the first device **100**, and stored in the first device **100**.

[0140] When the generated behavior guideline requires the approval (S**620**:Y), the first device **100** sends an approval request including the basic information and the behavior guideline to the system server **1000** (S**625**). While the behavior guideline corresponding to the prescription medication information may require the approval, various behavior guidelines such as exercise and diet may not require the approval.

[0141] Upon receiving the approval request from the first device **100**, the system server **1000** resends the approval request to the second device **200** matching the user of the first device **100** (S**630**). The system server **1000** can match the supervisor to the user subscribed to the health management service, and store an Internet Protocol (IP) address, an e-mail address, and a phone number of the second device **200** of the matched supervisor. Hence, when the subscribed user logs on and sends the approval request, the system server **1000** searches for the second device **200** by matching the user among the pre-stored information of the second devices, and sends the approval request to the matching second device **200**.

[0142] The second device **200**, upon receiving the approval request, displays a UI screen for the approval. Hence, the supervisor can check the user's basic information and behavior guideline through the UI screen and thus grant the approval (S**635**).

[0143] Upon the approval, the second device **200** sends an approval result to the system server **1000** (S**640**). The system server **1000** forwards the approval result to the first device **100** (S**645**).

[0144] When the approval is received, the first device **100** stores the behavior guideline (S**650**). Alternatively, when the approval is unnecessary (S**620**:N), the first device **100** stores the behavior guideline regardless of the approval (S**650**). If no approval result is received over a preset time, the first device **100** can resend the approval request for a preset number of times. Alternatively, when the approval fails, the first device **100** may resend the approval request by regenerating the behavior guideline, or requesting that the second device **200** to generate and send a behavior guideline that is approved. For example, the doctor using the second device may send a new approved behavior guideline in place of the behavior guideline that was received for approval.

[0145] When information about the user's behavior is collected with the behavior guideline stored, the first device **100** generates the behavior information based on the collected information (S**655**). The generation of the behavior information can be fulfilled in various manners as discussed above.

[0146] The first device **100** can generate the health care information by comparing the behavior information and the behavior guideline (S**660**). The health care information can be the feedback information generated according to the evaluation score determined by the behavior information, the new behavior guideline extracted by comparing the behavior guideline and the behavior information, or the temporary behavior guideline.

[0147] When the health care information is the new behavior guideline, the pre-stored behavior guideline is replaced by the new behavior guideline. When the health care information is the temporary behavior guideline and the external approval is received, the pervious behavior guideline is replaced by the temporary behavior guideline. As such, the behavior guideline can be changed dynamically according to the user's behavior.

[0148] When the health care information is stored and a preset event occurs (S**665**), the first device **100** sends the health care information to the system server **1000** (S**670**). The system server **1000** forwards the health care information to the second device **200** (S**675**).

[0149] While the first device **100** generates the behavior guideline and also the health care information for the health management in FIG. **6**, the system server **1000** may generate and manage the health care information. In this case, the first device **100** can display various guidance messages according to the behavior guideline. When collecting the data about the user's behavior, the first device **100** can generate the behavior information based on the collected data and send the behavior information to the system server **1000**. The behavior guideline generation of the first device **100** and the generation and the management of the health care information of the system server **1000** are substantially similar to those explained in FIG. **6** and shall be omitted here.

[0150] An entity for receiving the user's basic information, an entity for generating the behavior guideline, and an entity for generating the health care information can differ according to implementations.

[0151] <The System Server Generates the Behavior Guideline>

[0152] FIG. **7** is a timing diagram of a user customized health management method of the system according to another aspect of an exemplary embodiment.

[0153] Referring to FIG. **7**, the user inputs the user basic information to the first device **100** being his/her terminal device (S**710**), and the input basic information is transmitted to the system server **1000** (S**715**). In this case, the user can obtain his/her account by requesting the service subscription from the system server **1000** online or offline. The user can log on to the system server **1000** by inputting his/her ID and password. To open an account, the user may input information or provide various information that is modified by the user after the logon. This information can be provided to the system server **1000** as the basic information.

[0154] The system server **1000** generates the behavior guideline using the received basic information (S**720**). The behavior guideline can vary as stated earlier. The generation of the behavior guideline has been explained in FIG. **6** and thus shall be omitted here.

[0155] When generating the behavior guideline, the system server **1000** determines whether the behavior guideline requires the approval (S**725**). When the approval is required (S**725**:Y), the system server **1000** sends the approval request including the basic information and the behavior guideline of the user to the second device **200** (S**730**).

[0156] Upon receiving the approval request, the second device **200** displays an approval screen including the user's basic information and behavior guideline so that the supervisor can grant the approval. Hence, upon the approval (S**735**), the second device **200** sends the approval result to the system server **1000** (S**740**). When the approval result is received or the behavior guideline does not need the approval, the system server **1000** sends the behavior guideline to the first device **100** (S**745**).

[0157] The first device **100** stores the received behavior guideline and generates the behavior information using the collected data (S**750**).

[0158] The first device **100** generates the health care information by comparing the generated behavior information and the behavior guideline (S**755**). When a particular event occurs (S**760**:Y), the first device **100** sends the health care information to the system server **1000** (S**765**). The system server **1000** forwards the health care information received from the first device **100** to the second device **200** (S**770**).

[0159] The behavior information generation method or the health care information generation method, and the event type have already been described in detail and shall be omitted here.

[0160] FIG. **8** illustrates the generation of both the behavior guideline and the health care information in the system server **1000**.

[0161] Referring to FIG. **8**, the user inputs the user basic information to the first device **100** (S**810**), and the input basic information is transmitted to the system server **1000** (S**815**). The system server **1000** generates the behavior guideline using the received basic information (S**820**). When the approval is required (S**825**), the system server **1000** sends the approval request to the second device **200** (S**830**) and receives the approval (S**835** and S**840**).

[0162] When the approval is completed or the behavior guideline is determined without approval, the system server **1000** stores the determined behavior guideline in the account given to the user of the first device **100**.

[0163] The system server **1000** sends the generated behavior guideline to the first device **100** (S**845**). Upon receiving the behavior guideline, the first device **100** outputs adequate message including instructions corresponding to the behavior guideline such as an indication of a time and/or a place of the behavior guideline so that the user can behave to the behavior guideline. A type of the output message shall be explained. If the user does not need to know the behavior guideline, the transmission of the behavior guideline to the first device **100** may be omitted.

[0164] The first device **100** generates the user's behavior information by collecting data about the user's behavior (S**850**). The generated behavior information is transmitted to the system server **1000** (S**855**).

[0165] The system server **1000** generates the health care information by comparing the received behavior information and the pre-stored behavior guideline of the corresponding user (S**860**).

[0166] When a preset event takes place (S**865**), the system server **1000** sends the health care information to the first device **100** and the second device **200** respectively (S**870** and S**875**).

[0167] In some of the above described embodiments, the behavior guideline may be generated by the first device **100** or the system server **1000**, whereas the behavior guideline requiring the confirmation of the expert needs to be approved by the external device (i.e., the second device). In this respect, the expert being the supervisor can generate the behavior guideline using his/her terminal device. Hereafter, the behavior guideline generation in the second device is explained.

[0168] <The Second Device Generates the Behavior Guideline>

[0169] Referring to FIG. **9**, when the basic information is input (S**910**), the first device **100** sends the basic information to the system server **1000** (S**915**). The system server **1000** searches its pre-stored database for the second device **200** being the supervisor's terminal device matching the first device **100**. When the system server **1000** is implemented using a hospital server, the system server **1000** may contain a database including information about terminal devices of doctors, nurses, nutritionists, and rehabilitation trainers working in or cooperatively related to the hospital. Hence, the system server **1000** can select the supervisor matching the user's basic information using the database. For example, when the user subscribes to the health management service in order to cure his/her disease, the system server **1000** can match a medical specialist of the corresponding disease to the corresponding user, select the medical specialist as the supervisor for the user, and record this information in the database. Alternatively, when the user receives the rehabilitation therapy, the system server **1000** can select the rehabilitation trainer as the supervisor and match him/her with the user. Additionally, the system server **1000** can match the supervisor by collectively considering the user's age, gender, nationality, status, and service subscription purpose. The supervisor may be matched manually by the administrator who manages

the system server **1000**, or automatically according matching algorithm that matches the basic information of the user with an appropriate supervisor.

[0170] When detecting the second device **200**, the system server **1000** sends the user's basic information to the second device **200** (S**920**).

[0171] The second device **200** generates the behavior guideline based on the generated basic information (S**925**). The second device **200** sends the generated behavior guideline to the system server **1000** (S**930**). The system server **1000** forwards the behavior guideline to the first device **100** (S**935**).

[0172] The first device **100** stores the received behavior guideline (S**940**). The first device **100** can utilize the behavior guideline in various ways. For example, when the behavior guideline defines the administration time and the medication information, the first device **100** can notify the user to take the medicine by displaying the medicine information at a fixed time. When the exercise time arrives, the first device **100** can notify the user to exercise by outputting an alarm signal.

[0173] The first device **100** generates the behavior information by collecting the user's behavior information according to various collection methods (S**945**).

[0174] Hence, the first device **100** generates the health care information by comparing the generated behavior information with the behavior guideline (S**950**). The health care information can be generated diversely. That is, as mentioned in FIG. **4**, the health care information can include the evaluation score accumulated according to the conformity of the behavior information and the behavior guideline of the user. The health care information may also include the feedback information corresponding to the evaluation score. The evaluation score calculation and the feedback information have been described in detail and shall be omitted here.

[0175] The first device **100** sends the generated health care information to the system server **1000** (S**955**). The system server **1000** stores the received health care information (S**960**). At this time, when a preset event occurs (S**965**), the system server **1000** sends the health care information to the second device **200** (S**970**).

[0176] Herein, the event can vary as stated earlier. For example, when the evaluation score exceeds a first threshold or falls below a second threshold, the health care information can be transmitted. When a user's service subscription period or a preset test period expires, the system server **1000** can send the health care information.

[0177] Alternatively, the system server **1000**, when determining that the user's status reaches the goal, may send the health care information. When the user of the first device **100**, the supervisor of the second device **200**, the administrator of the system server **1000**, and other guardian requests to change the behavior guideline, the system server **1000** may send the health care information to the second device **200**.

[0178] The second device **200** can check the user's health care information, predict the user's status change, and change the behavior guideline (S**975**). The supervisor of the second device **200** can, when determining that the user successfully lives up to the behavior guideline, input an enhanced behavior guideline in order to achieve better results for the user. In contrast, when the user cannot keep up with the behavior guideline, the supervisor of the second device **200** can input moderate behavior guideline so that the user can keep up with the behavior guideline.

[0179] The behavior guideline can be divided into the long-term behavior guideline and the short-term behavior guideline as described above. The long-term behavior guideline changes according to a preset algorithm based on the cumulative score, the behavior information, personal health information, and medical information. For example, the long-term behavior guideline can include a medication type, an administration time, a dosage, an optimal exercise type, an exercise time, an exercise volume, a food intake amount, a meal time, an optimal food type, an optimal bowl volume, a bowl type, a sleeping time, a bedtime, a wake-up time, and a sleeping environment. The supervisor can modify these various long-term behavior guidelines according to the status of the user. The short-term behavior guideline can be modified collaterally according to the long-term behavior guideline.

[0180] Thus, when the new behavior guideline modified from the previous behavior guideline is input in the second device **200** (S**975**), the second device **200** sends the behavior guideline to the system server **1000** (S**980**). The system server **1000** forwards the behavior guideline to the first device **100** (S**985**). The first device **100** updates the behavior guideline with the received new behavior guideline (S**990**).

[0181] While the user's basic information is input through the first device **100** and forwarded to the second device **200** via the system server **1000** in FIG. **9**, the user's basic information may be input directly to the second device **200** in case of an offline contract. For example, when the user consults his/her doctor at a hospital, the user's basic information obtained in the medical treatment can be input directly to the second device **200** managed by the doctor or the nurse.

[0182] FIG. **10** depicts the direct input of the user's basic information to the second device. Referring to FIG. **10**, the user's basic information is input directly to the second device **200** (S**1010**), and his/her behavior guideline is generated together (S**1015**).

[0183] The second device **200** sends the generated behavior guideline to the system server **1000** (S**1020**). The system server **1000** forwards the behavior guideline to the first device **100** of the user who took the medical treatment (S**1025**).

[0184] The first device **100** stores the behavior guideline (S**1030**) to induce the user's appropriate behavior using the stored behavior guideline in various manners.

[0185] The first device **100** generates the behavior information of the user (S**1035**) and sends the behavior information to the system server **1000** (S**1040**). The system server **1000** generates the health care information by comparing the received behavior information and the behavior guideline (S**1045**).

[0186] The system server **1000** sends the generated health care information to the second device **200** (S**1050**). The health care information can be transmitted to the second device **200** when the second device **200** requests the transmission or a preset transmission cycle arrives. The health care information may be transmitted to the first device **100**, which is not depicted in FIG. **10**.

[0187] Upon receiving the health care information, the second device **200** displays a behavior guideline input screen including the health care information. The supervisor generates the new behavior guideline by modifying the behavior guideline of the user of the first device **100** through the behavior guideline input screen (S**1055**).

[0188] The second device **200** sends the generated new behavior guideline to the system server **1000** (S**1060**), and the system server **1000** forwards the received new behavior guideline to the first device **100** (S**1065**).

[0189] The first device **100**, upon receiving the new behavior guideline, updates the previous behavior guideline (S**1070**). The first device **100** and the system server **1000** manage the user's behavior according to the newly updated behavior guideline.

[0190] FIG. **11** illustrates operations of the system according to another aspect of an exemplary embodiment. Referring to FIG. **11**, the user's basic information is input to the first device **100** (S**1110**).

[0191] The input basic information is transmitted to the second device **200** via the system server **1000** (S**1115** and S**1120**). The second device **200** generates the behavior guideline based on the user's basic information (S**1125**), and provides the generated behavior guideline to the first device **100** via the system server **1000** (S**1130** and S**1135**). The system server **1000** stores the behavior guideline in a storage space allocated for the user of the first device **100**.

[0192] The first device **100** stores the received behavior guideline (S**1140**), generates the behavior information (S**1145**), and sends the behavior information to the system server **1000** (S**1150**). The system server **1000** generates the health care information by comparing the received behavior information and the behavior guideline stored for the user of the first device **100** (S**1155**).

[0193] The system server **1000** sends the generated health care information to the second device **200** (S**1160**). The new behavior guideline modified from the behavior guideline based on the health care information that is input to the second device **200** (S**1165**). The second device **200** sends the new behavior guideline to the system server **1000** (S**1170**).

[0194] The system server **1000** forwards the new behavior guideline to the first device **100** (S**1175**). The first device **100** updates the behavior guideline according to the received new behavior guideline (S**1180**).

[0195] As such, the user's basic information input or the behavior guideline generation can be carried out variously in the first device **100**, the system server **1000**, and the second device **200**. In particular, the user's basic information can be manually input in the device of the user, the system administrator, or the supervisor (i.e., the doctor). In this case, when simple identification information such as user's resident registration number, previously allocated management number, or user ID is input, necessary information may be collected by automatically linking to user's personal health information stored in the system server **1000** or a separate external server. For example, when the user inputs the resident registration number, the system server **1000** can collect various information such as user's therapy record, medical history, family anamnesis, and insurance payment record from a one or more databases located in the server, a medical insurance corporation server, a hospital server, and an insurance company server, and utilize the information for generation of the behavior guideline.

[0196] In some embodiments, the behavior guideline is generated by and received from the external device, that is, the system server **1000** or the second device **200**, rather than the first device **100**. In this case, the first device **100** can receive the behavior guideline together with various additional information from the external device. For example, the additional information can include general information useful for the health care, an advertisement, insurance data, information about the positive effects of adhering to the behavior guideline, and information about the negative effects of not adhering to the behavior guideline. The first device **100** can store and use the behavior guideline and the additional information. When receiving such new information, the first device **100** updates the previous information with the new information.

[0197] The health care information can be also generated and managed by the first device **100** or the system server **1000**. While the health care information generation in the second device **200** is not illustrated in the aforementioned embodiments, the second device **200** may generate and manage the health care information in some cases.

[0198] <Association with Other Device>

[0199] FIG. **12** depicts the health management service support from other devices in addition to the first device **100**, the system server **1000**, and the second device **200**.

[0200] Referring to FIG. **12**, when the basic information is input to the first device **100** (S**1210**), the first device **100** sends the basic information to the system server **1000** (S**1215**).

[0201] The basic information can further include information of the third and fourth devices **300** and **400** in addition to various user information. The third and fourth devices **300** and **400** can employ a server or a terminal device of another person of various interests. In FIG. **12**, it is assumed that the third device **300** is implemented using the insurance company server and the fourth device **400** is implemented using the guardian terminal device.

[0202] The system server **1000** forwards the basic information to the second device **200** (S**1220**).

[0203] The second device **200** generates the behavior guideline based on the received basic information (S**1225**). The second device **200** sends the generated behavior guideline to the system server **1000** (S**1230**).

[0204] The system server **1000** forwards the received behavior guideline to the first device **100** and the third device **300** (S**1235** and S**1240**). If necessary, the system server **1000** can also send the behavior guideline to the fourth device **400**, which is not depicted in FIG. **12**.

[0205] Upon receiving the behavior guideline, the third device **300** can generate insurance data based on the received behavior guideline (S**1245**). That is, the third device **300** can calculate an insurance fee, an insurance benefit, an insurance period based on the various information of the user. The calculated insurance data can be transmitted to the first device **100** or the fourth device **400** and used to make an insurance contract or to renew the insurance.

[0206] To share information with the insurance company, the operator of the third device **300**, that is, the insurance company can make an arrangement with the administrator of the system server **1000**. That is, the present general inventive concept can be realized as a Business to Business (B2B) model based on the arrangement between businesses, to be explained.

[0207] Meanwhile, upon receiving the behavior guideline, the first device **100** stores the received behavior guideline (S**1250**) and generates the behavior information (S**1255**). The generated behavior information is transmitted to the system server **1000** (S**1260**).

[0208] The system server **1000** generates the health care information by comparing the behavior information and the behavior guideline (S**1265**).

[0209] The system server **1000** sends the generated health care information to the second device **200** and the third device **300** respectively (S**1270** and S**1275**).

[0210] The second device **200** generates the new behavior guideline based on the user's health care information (S**1280**). The new behavior guideline is sent to the system server **1000** (S**1285**).

[0211] The system server **1000** sends the new behavior guideline to the first device **100** and the third device **300** (S**1290** and S**1295**).

[0212] The first device **100** updates the behavior guideline using the new behavior guideline (S**1300**).

[0213] The third device **300**, when receiving the new behavior guideline, updates the insurance data based on at least one of the health care information and the new behavior guideline of the user (S**1310**). The insurance data can be updated manually according to the direct input of the user of the third device **300**, or automatically according to a preset insurance fee calculation algorithm. For example, when the evaluation score of the health care information is high, the insurance fee can be lowered in proportion to the evaluation score. When the evaluation score is low, the insurance fee can be raised.

[0214] When a preset event arises (S**1305**), the system server **1000** can send various information such as previous behavior guideline, new behavior guideline, user basic information, and health care information to the first through fourth devices respectively (S**1315**, S**1320**, S**1325**, S**1330**).

[0215] In FIG. **12**, various lifestyle management services, consumer services, as well as health management can be performed together by considering the behavior guideline created for the user and the user's actual behavior.

[0216] FIG. **13** is a block diagram of the first device **100** according to an aspect of an exemplary embodiment.

[0217] Referring to FIG. **13**, the first device **100** includes a short-range wireless communication unit **110**, a controller **120**, a storage **130**, an input **140**, an output **150**, and a communication unit **160**.

[0218] The input **140** can include various input means such as touch screen, touchpad, button, remote control signal interface, keyboard, mouse, and joystick. Hence, the input **140** receives and forwards the user's basic information or various user commands to the controller **120**.

[0219] The controller **120** operates according to the command input through the input **140**. The controller **120** includes a system memory, a main CPU, an image processor, and various interfaces. The controller **120** can include an interface connected to the storage **130**, a network interface connected to the communication unit **160**, and an interface connected to other port. A detailed structure and operations of the controller **120** shall be explained further.

[0220] The controller **120** generates the behavior information using an application stored in the storage **130**, and stores the generated behavior information in the storage **130**. The communication unit **160** transmits the behavior information stored in the storage **130** to the system server **1000**. According to the execution of the application, the controller **120** can offer the user customized health management service according to various aspects of exemplary embodiments. Hereafter, the operations of the controller **120** according to an aspect of an exemplary embodiment will be explained.

[0221] When the user's basic information is input to the first device **100**, the controller **120** generates a User Interface (UI) screen by driving the embedded image processor and displays the UI screen through the output **150**. The image processor can perform various image processes such as graphic rendering and scaling.

[0222] The output **150** can include a display unit and a speaker. The output **150** displays the UI provided from the controller **120** through the display unit. The user can input the basic information using the input **140** on the UI. The controller **120** can send the input basic information to the system server **1000** or other external device. As mentioned above, the basic information can include the identification information such as user's name, user ID, and resident registration number, and management number for identifying the user, the characteristic information such as height, weight, age, gender, blood type of the user, and the special information such as user therapy record, medical history, family anamnesis, physical constitution, life habit, and exercise history. The medical information such as therapy record, medical history, and family anamnesis may be referred to as health information. The basic information may be sensed by a separate biometric sensor or received from an external device, rather than being input by the user in person.

[0223] When the first device **100** directly generates and manages the behavior guideline and the health care information, the controller **120** generates various behavior guidelines using the user's input basic information. The behavior guidelines can include various information such as exercise information, food intake information, medication information, and living environment information. The behavior guidelines can include the first behavior guideline requiring the external approval and the second behavior guideline without the external approval. The behavior guidelines may include the long-term behavior guidelines and the short-term behavior guidelines.

[0224] An example of behavior guidelines generated based on the user's basic information is shown in the following table.

TABLE 1

Age	Height	Weight	Recommended behavior guideline
10~15	~140	~50 kg	Take calcium tablet twice a day. Take vitamin once a day. Jump rope 200 times a day.
10~15	140~150	50~60 kg	Take calcium tablet twice a day. Jump rope 100 times a day.
10~15	160~170	60~70 kg	Take vitamin once a day. Jog three times a week.
10~15	170~180~	70~80 kg	Jog three times a week (each 1 hour). Low-salt diet.
10~15	180~	80 kg~	Exercise more than 3 times a week without placing strain on the knees (recommended: walking; not recommended: running, rope skipping). Maintain a low-calorie diet. Take vitamin once a day.
16~10	. . .	. . .	. . .
. . .	. . .	. . .	. . .

[0225] In Table 1, the age, the height, and the weight correspond to the user's basic information. The recommended behavior guideline indicates an optimal behavior guideline according to each element of the basic information of user. Using the database of FIG. **1**, the controller **120** can automatically define the behavior guideline according to the user's basic information.

[0226] The recommended behavior guidelines for the age range between 10~15 and the height and the weight are individually set in Table 1 for simplified explanation. However, a

plurality of weight ranges can be classified based on the height range within the same age range and the recommended behavior guideline can vary per weight range.

[0227] The recommended behavior guideline can be subdivided by adding various items such as gender, nationality, region, and heart rate to the basic information.

[0228] The type and the generation of the behavior guideline have been described already and shall be omitted here.

[0229] The controller **120** stores the generated behavior guideline in the storage **130**. When the behavior information is generated, the controller **120** generates the health care information by comparing the behavior information and the behavior guideline. The health care information can calculate and record the evaluation score based on the comparison result of the behavior information and the behavior guideline as aforementioned. For example, the health care information can be generated as follows.

TABLE 2

Exercise Guideline	Actual Exercise	Reference Heart Rate	Actual Heart Rate	Cumulative Score	Feedback Type	Feedback Information	Modified Exercise Guideline
3 times a week	3 times a week	60~70	65	10	Popup Message	Good for you! Increase exercise intensity?	4 times a week
3 times a week	Once a week	60~70	77	6	Popup Message	Heart is beating fast. Please close your eyes and take a deep breath.	
3 times a week	5 times a week	60~70	0	10	Alarm & Emergency Rescue Request	Emergency Cardiac Care Required	

[0230] In Table 2, when the behavior guideline is set to 3 times a week, the behavior information, that is, the actual exercise that is recorded is set to 3 times, once, and 5 times a week. The exercise guideline of Table 2 is the behavior guideline adjustable by the user, and a reference heartbeat or an actual heartbeat corresponds to a health index of the user which is measured and not controlled by the user. Another example of the health index may be blood pressure or blood sugar.

[0231] The cumulative score can be automatically calculated by the device. When the activity exceeds the number of times defined by the behavior guideline, the cumulative score of 10 is applied. The cumulative score of 6 is applied when the user exercises only once a week. As the basic information includes the user's heart rate, the feedback information content and the feedback type are determined according to heart rate information. The heart rate information can be sensed by a bio-signal sensor connected to or embedded in the first device **100**. Hence, the behavior can be monitored based on the behavior guideline. If an abnormal symptom of the user is detected, the user may be provided with emergency care.

[0232] Based on a database containing information similar to that of Table 1 and Table 2, the controller **120** can generate the behavior guideline and the health care information. When the generated behavior guideline requires the external approval, the request is sent to the external device to request the approval, which has been explained above and is omitted here.

[0233] When the first device **100** generates the behavior guideline and the system server **1000** generates the health care information, the controller **120** can send the generated behavior guideline to the system server **1000**.

[0234] Meanwhile, when the system server **1000** or the second device **200** generates the behavior guideline, the controller **120** receives the behavior guideline through the communication unit **160** and stores the behavior guideline in the storage **130**. Hence, the controller **120** can generate the health care information by comparing the behavior guideline and the behavior information, and store the generated health care information in the storage **130**.

[0235] When the system server **1000** generates and manages the health care information, the controller **120** may send only the behavior information to the system server **1000** and be controlled by the system server **1000**.

[0236] As above, the operations of the components of the first device **100** can differ according to the implementation and have been described in the exemplary embodiments, and thus shall be omitted here.

[0237] FIG. **14** depicts an input screen for inputting the user's basic information. When the user basic information is input to the first device **100** and the first device **100** generates the behavior information, the first device **100** displays the screen of FIG. **14**. Referring to FIG. **14**, the input screen **1500-1** displays an input region for inputting various items such as name, gender, age, resident registration number, height, weight, goal weight, and exercise duration, and various menu items **1501** and **1502** for modifying or ending the input. The user can input the basic information by touching the input region and entering numbers or characters in person, and complete the basic information input by selecting the end menu item **1502**.

[0238] When the user finishes the basic information input, the input basic information is stored and the behavior guideline is automatically generated according to the stored input information. Accordingly, a behavior guideline generation screen **1500-2** is displayed. The behavior guideline generation screen **1500-2** displays the current user status and various behavior guidelines.

[0239] In FIG. **14**, the diet guideline and the exercise guideline are generated and displayed. All of the behavior guidelines may be automatically generated as stated earlier, whereas some behavior guidelines may be selected by the

user. For example, the first behavior guideline is automatically set, and the exercise guideline being the second behavior guideline can be selected by the user as shown in FIG. **14**. Thus, the behavior guideline generation screen **1500-2** displays an exercise information region **1503** showing the exercise type, a selection button **1504** for changing the exercise type, and an exercise volume region **1505** indicating the exercise volume based on the selected exercise type. When the selection button **1504** is selected, a list of the selectable exercise types is opened under the exercise information region **1503**. When the user selects the walking in the list, the appropriate walking distance is displayed in the exercise volume region **1505**.

[0240] The screen of FIG. **14** can be displayed in the device which inputs the user's basic information. That is, one of the first device **100**, the system server **1000**, and the second device **200** can display the screen of FIG. **14** so as to input the basic information.

[0241] The diet guideline or the exercise guideline of FIG. **14** can generate the behavior guideline without the external approval. However, the user or the first device **100** cannot arbitrarily generate the behavior guideline for the medication. In this case, the second device **200** can generate and send the behavior guideline to the first device **100** as shown in FIGS. **9**, **10** and **11**.

[0242] The input screen of FIG. **14** can be the screen in a webpage accessed by the user to subscribe to the user customized health management service operated by the administrator of the system server **1000**. For example, when the user accesses the web page of the administrator online and applies for the service, a screen for inputting the user's basic information similar to the basic information input screen **1500-1** of FIG. **14** can be displayed in the process of subscribing to the service.

[0243] FIG. **15** depicts an input screen **210** displayed to generate the behavior guideline in the second device **200**.

[0244] The input screen **210** displays a region **211** for inputting the user's identification information and characteristic information, a region **212** for inputting the special information including the user's health information, a region **213** for inputting the user prescription, and various menu items **214** for modifying, adding, or ending the information input.

[0245] The supervisor using the second device **200** inputs necessary information in each region. In detail, the supervisor can enter the medicine to administer, the route of the administration, and the dosage. Hence, the user's behavior guideline is generated.

[0246] FIG. **16** depicts an input screen for inputting the new behavior guideline by modifying the user behavior guideline.

[0247] Referring to FIG. **16**, the input screen **310** displayed in the second device **200** displays a region **311** for displaying the user's identification information and characteristic information, a region **312** for inputting the special information including the user health information, a region **313** for displaying the behavior guideline information generated by the user in advance, a region **314** for displaying the health care information generated by comparing the user's behavior information and behavior guideline, a menu item **315-1** for modifying the behavior guideline, a menu item **315-2** for completion of the entry, and a menu item **315-3** for printing.

[0248] In FIG. **16**, the evaluation score calculated per drug is displayed as the health care information while the behavior guideline defines the administration route. From the input screen of FIG. **16**, the supervisor can determine whether the user takes good care of his/her health and whether to modify the behavior guideline. When the supervisor selects the behavior guideline modify menu item **315-1** on the input screen **310** of FIG. **16**, the input screen **210** of FIG. **15** is displayed again and the supervisor can modify the behavior guideline on the input screen **210** of FIG. **15**.

[0249] Besides the user's behavior information, biological information indicating the actual body condition of the user can be sensed and provided together. For example, the biological information such as blood pressure, blood sugar, body temperature, and heart rate can be provided. The biological information can be also displayed on the screen **310** of FIG. **16**. In this case, based on the biological information and the user behavior information displayed on the screen, the supervisor can determine whether the user recovers his/her health and whether the drug is effective. Hence, when the drug is ineffective or the health recovery is slow, the supervisor can generate the new behavior guideline by modifying the behavior guideline to change the drug or increase the dosage. When determining that the user is completely recovered, the supervisor may delete the behavior guideline for the medication because the user does not need to take the drug any more.

[0250] FIG. **17** depicts a screen displaying the health care information. Referring to FIG. **17**, the health care information screen **1600** includes a region **1610** for displaying the user's basic information, regions **1620** and **1630** for displaying various behavior guidelines, a region **1640** for displaying the health care information, and various menu items **1651** through **1654** for using the information. The health care information screen **1600** of FIG. **17** can be displayed by the device which generates the health care information. According to various configurations, one of the first device **100**, the system server **1000**, and the second device **200** can display the screen of FIG. **17**.

[0251] For example, when the first device **100** displays the screen of FIG. **17**, the user can print the health care information screen by selecting the print menu item **1651** and send the health care information to the external device by selecting the send menu item **1652**. When the send menu item **1652** is selected, a list of devices for transmitting information to can be displayed. The list displays various information about the system server **1000**, the second device **200**, the third device **300**, and the fourth device **400**. The user can select the transmission destination by selecting the information on the list and send the health care information to the destination.

[0252] As above, the user's basic information, behavior guideline, and health care information can be displayed by various screens. The screen structure can differ according to the type of the first device **100**.

[0253] <Various Screen Structures for the Information Display>

[0254] FIGS. **18** through **22** depict various example screens of the first device **100** which manages the user's health using the behavior guideline and the health care information. FIGS. **18** through **22** show the example screens when the first device **100** is wearable on the user's wrist.

[0255] Referring to FIG. **18**, the first device **100** displays the health care information **1800** converted into an evaluation score. The health care information of FIG. **18** can be displayed continuously or periodically, or only when the user inputs the command. Based on the health care score, the user can be spurred to perform activities to care for their health.

[0256] When the evaluation score is accumulated over a preset first threshold, the first device **100** displays a compli-

ment message. When the evaluation score is accumulated below a preset second threshold, the first device **100** displays a warning message. The compliment message or the warning message may be displayed on the first device **100**, or provided to the system server **1000** or the second device **200**.

[0257] FIG. **19** depicts a screen **1900** displaying the warning message when the evaluation score falls below a preset threshold. In this case, the screen **1900** can be displayed together with the vibration or the notification sound. Alternatively, the color of the screen **1900** displaying the warning message can be changed or flickered to notify of the urgent situation. In this case, a display frequency, a sound volume, a vibration intensity, a light intensity, a notification time, a notification target of the warning message can differ according to the urgency or the evaluation score.

[0258] Meanwhile, the above-stated behavior information can be generated based on the information collected through the short-range access of the external object. In this case, upon the access to the external object, a screen inquiring about whether the user actually takes the medicine can be displayed.

[0259] FIG. **20** depicts such a screen. Referring to FIG. **20**, when a medicine bottle A is accessed, a screen **2000** including menu items **2010** and **2020** inquiring about the actual drug use is displayed. When the user selects Yes **2010**, the behavior information of the corresponding medication is generated. When the user selects No **2020**, wrong tagging is determined and the collected data is discarded.

[0260] FIG. **21** depicts a screen **2100** for guiding the user to behave according to the behavior guideline. Referring to FIG. **21**, the first device **100** displays a screen informing of the medication administration time and dosage. In this case, the vibration or the notification sound can be output together, and the behavior according to the behavior guideline can be induced or encouraged by changing the color of the screen **2100** or switching on and off the screen **2100** repeatedly.

[0261] FIG. **22** depicts a sequence of menus and screens showing how to input the user's basic information in the first device **100** and to manage the user's health using the first device.

[0262] Referring to FIG. **22**, a standby screen **2200** of the first device **100** displays a management menu item **2201** for initiating the health management, a setup menu item **2202** for inputting the basic information, and a menu item **2203** for switching a mode. When the user selects the setup menu item **2202**, a screen **2200-1** for inputting the name of the user's basic information is displayed. The screen **2200-1** displays a region for displaying the name and a soft key for entering the name. When the name is input, a screen **2200-2** for inputting the basic information such as gender, age, height, and weight is displayed. When the basic information is input, a screen **2200-3** including a menu for finishing or modifying the setup is displayed. When the setup completion menu is selected in the screen **2200-3**, the screen is switched back to the standby screen **2200**.

[0263] When the user selects the management menu item **2201** on the standby screen **2200**, the screen is switched to a management screen **2200-4**. The management screen **2200-4** displays information about the activity to do based on the behavior guideline. The management screen **2200-4** of FIG. **22** includes a message notifying or reminding the user of the time to exercise that is an hour away based on the current time of 9:00 AM. When the exercise time arrives, a management screen **2200-5** including a message notifying that it is time to exercise is displayed. The user may begin the exercise according to the message, or disregard the message.

[0264] When the user takes the exercise according to the behavior guideline, a management screen **2200-6** displays the positive feedback and the added evaluation score. In contrast, when the user disregards the behavior guideline and does not take the exercise, a management screen **2200-7** displays the negative feedback and the reduced evaluation score.

[0265] As above, even when the first device **100** includes the small display screen wearable on the user's wrist, it can easily fulfill the basic information input, the behavior guideline display, the health care information display. The health care information can be displayed using a graph or a drawing instead of the text.

[0266] FIG. **23** depicts a graph showing the accumulation of the evaluation score according to the date when the health care information is recorded as the evaluation score. In FIG. **23**, the vertical axis indicates the cumulative evaluation score and the horizontal axis indicates the date. On the graph, the date of the best health care or the date of the worst health care can be highlighted by changing its color or flickering. In FIG. **23**, the first-day bar of the lowest evaluation score and the eleventh-day bar of the highest evaluation score are colored differently from the other bars.

[0267] When the graph of FIG. **23** is displayed, the user can enlarge the graph. When a touch screen function is supported, the user may enlarge the graph by directly touching the graph or by touching the graph with two or more fingers and pinching the touch points apart. When the graph is zoomed in, different graphs showing detailed health care information such as exercise, medication and food can be additionally displayed.

[0268] FIG. **24** depicts the zoom-in graph. Referring to FIG. **24**, the health care information is generated differently based on the behavior guideline. That is, respective graphs for the exercise guideline, the medication guideline, and the food intake guideline are displayed. The length of the graph indicates the evaluation score. When the user selects the graph in FIG. **24**, the screen can additionally display detailed information **2410**. In FIG. **24**, the detailed information **2410** displays the administration time and the dosage.

[0269] While the user enlarges the graph of FIG. **23** to arrive at the graph in FIG. **24**, the graph of FIG. **24** may be displayed initially. While a bar graph is depicted in FIGS. **23** and **24**, a circle graph or other graphs may be applied and displayed.

[0270] The duration for displaying the evaluation score using the graph can be arbitrarily selected by the user. For example, the user can select the unit such as one year, one month, first quarter, and one week, or input the duration in person. Alternatively, each graph can be divided on a weekly basis and displayed in a single page. In this case, the user's touch or scroll may switch to a page showing a previous or following week's evaluation score.

[0271] As mentioned above, the user terminal device can be implemented using various devices. When the user terminal device is implemented using a small device wearable on the wrist or attachable to other body part such as belt or ankle, like a pedometer, its display size is limited. The small display device can display the screen in the layout for the display size, and the display information can be simplified.

[0272] FIGS. **25** through **29** depict various screens displayable by the device including the small display.

[0273] Referring to FIG. **25**, the screen can include a message notifying the user that it is time to take the drug according to the behavior guideline, the drug name to take, and the dosage, a button **2510** for receiving user input indicating that the drug is taken, and a cancel menu item **2520** which disregards the message. In FIG. **25**, although the drug information is not received directly through the short-range wireless communication, when the menu item **2510** for the medication check is selected, the device generates the behavior information about the user's medication administration and accordingly generates the health care information. For example, a certain value can be added to the evaluation score. In this case, the first device **100** can omit the short-range wireless communication reader. In contrast, when the cancel menu item **2520** is selected, the device can generate the behavior information indicating that no medication is taken and accordingly subtract a certain value from the evaluation score.

[0274] Referring to FIG. **26**, the displayed screen can include a congratulatory message when the user's health is cared for successfully and the evaluation score is greater than predetermined value, a menu item **2610** for providing more information on how to increase the evaluation score for exercise may be provided, and an OK menu item **2620** for dismissing the message. When the menu item **2610** is selected in FIG. **26**, additional detailed information is displayed about to raise the evaluation score of the user. Hence, user's competitive spirit is stimulated and the user may show more interest in health care.

[0275] Referring to FIG. **27**, when the health of the user is cared for continuously and the cumulative evaluation score exceeds a first threshold, the screen can display a message informing the user of the good health management, a menu item **2710** for raising the behavior guideline, and a cancel menu item **2720** for dismissing the message.

[0276] Referring to FIG. **28**, when the user's health is managed poorly, the screen can display a message notifying the user of a reduced exercise score, a menu item **2810** for checking additional information to enhance the user's behavior, and an OK menu item **2820** for dismissing the message.

[0277] Referring to FIG. **29**, when the user's health is health is not cared for continuously and the cumulative score falls below a second threshold, the screen can display a warning message, a menu item **2910** for checking additional information to enhance the user's behavior, and an OK menu item **2920** for dismissing the message. While only two menus items **2910** and **2920** are displayed in FIG. **29**, the screen may further include a menu item for sending the evaluation score to an expert or a menu item for requesting a decrease in the behavior guideline. As the screen of FIG. **29** is displayed, the user's health care information may be automatically transmitted to the supervisor at the same time. As discussed above, various information can be provided in various screens when the health management service is provided.

[0278] Meanwhile, the first device **100** can be implemented using the user terminal device. The operations of the user terminal device can vary according to implementations. Now, the operations of the user terminal device are elucidated according to implementations.

[0279] <Operations in the User Terminal Device>

[0280] FIG. **30** is a flowchart of a user customized health management method of the user terminal device according to an exemplary embodiment. Referring to FIG. **30**, the user terminal device obtains the user's behavior while the behavior guideline is stored, and manages the health of the user by itself.

[0281] In detail, the user terminal device receives data about the user's behavior (S**3010**). The data may be received using the short-range wireless communication, through the direct input, or from the external device as stated earlier.

[0282] Using the received data, the user terminal device generates the behavior information (S**3020**). The behavior information generation has been explained in the exemplary embodiments described above and shall be omitted here.

[0283] The user terminal device compares the pre-stored behavior guideline and the behavior information (S**3030**). The behavior guideline can be manually input by the user to the user terminal device, or automatically generated by the user terminal device. Also, the behavior guideline can be received from the external device. The behavior guideline and the behavior guideline generation can vary according to the implementation, have been described above, and shall be omitted here.

[0284] Based on the comparison of the behavior guideline and the behavior information, the user terminal device generates and stores the health care information (S**3040**). The behavior guideline and the health care information can be used diversely as described in FIGS. **18** through **29**.

[0285] According to the implementations, the behavior guideline and the health care information can be transmitted to the external device. In particular, when the behavior guideline requires the approval, the approval request is transmitted to the external device. Only when the approval is received, the behavior guideline can be stored and used.

[0286] FIG. **31** is a flowchart of a method for creating and storing the behavior guideline in the user terminal device.

[0287] Referring to FIG. **31**, when the user basic information is input (S**3110**) and the behavior guideline is generated based on the basic information (S**3120**), the user terminal device determines whether the behavior guideline requires the approval (S**3130**).

[0288] When the approval is unnecessary, the user terminal device stores the behavior guideline (S**3170**).

[0289] Alternatively, when the approval is necessary, the user terminal device sends the request to the external device (S**3140**). Herein, the external device can be the system server **1000** or the second device **200**. When the information of the second device **200** is not stored, the user terminal device may gain the approval of the second device **200** through the system server **1000**.

[0290] Hence, when the approval of the external device is received (S**3150**), the user terminal device stores the approved behavior guideline (S**3170**). Alternatively, when the approval of the external device is not received within a predetermined period of time, the user terminal device discards the generated behavior guideline (S**3160**) and regenerates the behavior guideline (S**3120**).

[0291] As such, the user terminal device generates the behavior guideline requiring the external approval and the behavior guideline requiring no external approval to manage the user's health.

[0292] FIG. **32** is a flowchart of a user customized health management method of the user terminal device according to another aspect of an exemplary embodiment.

[0293] Referring to FIG. **32**, the user terminal device receives the behavior guideline generated by the external device (S**3210**). When the user terminal device is imple-

mented using the first device **100** of the system of FIG. **1**, the external device can be the second device **200** and the user terminal device can receive the behavior guideline generated by the second device **200** via the system server **1000**.

[0294] At this time, when nearby objects are accessed by the user terminal (S**3220**), the user terminal device receives data from the nearby objects (S**3230**) and generates the behavior information (S**3240**).

[0295] The user terminal device compares the behavior guideline and the behavior information (S**3250**) and generates the health care information according to the comparison (S**3260**). The user terminal device sends the generated health care information to the external device (S**3270**). The health care information may include the feedback information generated based on an evaluation score generated according to the comparison of the behavior guideline and the behavior information, or the text or the graph indicating the match rate or the match level between the behavior guideline and the behavior information. The health care information may include the temporary behavior guideline extracted based on the comparison of the behavior guideline and the behavior information. Additionally, the temporary behavior guideline can be a temporarily modified behavior guideline according to the match level of the behavior guideline and the behavior information. The user terminal device can send the temporary behavior guideline to the external device, gain the approval from the external device, and then replace the previous behavior guideline by the temporary behavior guideline.

[0296] When receiving the new behavior guideline from the external device (S**3280**), the user terminal device updates the behavior guideline with the new behavior guideline (S**3290**).

[0297] The user terminal device then manages the user's health according to the updated behavior guideline. Alternatively, the system server may generate and store the health care information. In this case, the generation and the storing of the health care information in FIGS. **30** through **33** may be omitted.

[0298] <Operations in the System Server>

[0299] FIG. **33** is a flowchart of a user customized health management method of the system server.

[0300] Referring to FIG. **33**, the system server **1000** receives the behavior guideline from the second device **200** (S**3310**). The behavior guideline can be generated based on the user's basic information. The basic information may be input from the first device **100** or the system server **1000** and forwarded to the second device **200**, or directly input to the second device **200**.

[0301] The system server **1000** sends the behavior guideline to the first device **100** (S**3320**). The system server **1000** stores the behavior guideline in the storage space allocated for the user of the first device **100**. After receiving the behavior information from the first device **100** (S**3330**), the system server **1000** compares the behavior guideline and the behavior information (S**3340**).

[0302] The system server **1000** generates the health care information according to the comparison (S**3350**). When a preset event occurs, the system server **1000** sends the health care information to the second device **200** (S**3360**). In this case, the system server **1000** may send the health care information to various external devices such as the first device **100** or the third device **300**, besides the second device **200**.

[0303] When receiving the new behavior guideline from the second device **200** (S**3370**), the system server **1000** forwards the received new behavior guideline to the first device **100** (S**3380**).

[0304] Hence, the behavior guideline can be adaptively changed according to the user's behavior. For example, for good user health management, the behavior guideline can be intensified to enhance the effect. For poor user health management, the behavior guideline can be loosened to encourage the user to follow the behavior guideline more easily.

[0305] Meanwhile, after the user's disease is completely cured or the enough medication is taken, the new behavior guideline may be generated by deleting all or part of the previous behavior guideline. When part of the behavior guideline is deleted, the first device **100** manages the health with the other behavior guidelines excluding the deleted behavior guideline. Alternatively, when all of the behavior guideline is deleted, the first device **100** can manage the health according to the general healthy life habit information. For example, the first device **100** can induce the user to care his/her health by periodically outputting a message encouraging the user to have a meal at a fixed time and to exercise. The healthy life habit information can be transmitted as additional information together with the behavior guideline. The operations of the system server **1000** may differ according to the implementations which have been illustrated.

[0306] FIG. **34** depicts a health management system of the B2B model. Referring to FIG. **34**, the health management system includes the first device **100**, the system server **1000**, a hospital server **200-1**, the second device **200**, an insurance company server **300-1**, the third device **300**, and a guardian terminal device **400**.

[0307] The user subscribes to the user customized health management service of the administrator of the system server **1000**. The service may be subscribed to online through the first device **100** or other user terminal device, or offline. In the service subscription, the user provides the administrator of the system server **1000** with his/her basic personal information such as name, age, resident registration number, gender, weight, and height. In association with other servers using the basic personal information, the administrator of the system server **1000** automatically collects user information. For example, the therapy record, the medical history, the family anamnesis, and the physical constitution information can be collected.

[0308] According to the contract with the user, the administrator of the system server **1000** generates the account of the user and allocates the storage space for the account. The administrator sends the user's basic information to the related hospital server **200-1** and insurance company server **300-1**.

[0309] The hospital server **200-1** selects the supervisor relating to the user's condition among supervisors such as doctors or nurses, and matches information of the second device **200** of the supervisor with the user. Accordingly, when the user's behavior guideline is input to the second device **200**, the hospital server **200-1** forwards the behavior guideline to the system server **1000**. The system server **1000** sends the behavior guideline to the first device **100** and the fourth device **400** of the guardian.

[0310] According to the received behavior guideline, the first device **100** outputs a message for guiding the user's behavior or a message notifying of an activity time according to the behavior guideline, and thus manages the user's health.

[0311] The first device **100** generates the behavior information by collecting data about the user's behavior, and sends the generated behavior information to the system server **1000**. The system server **1000** stores the received behavior information in the storage space allocated for the user's account, and generates and stores the health care information by comparing the pre-stored behavior guideline and the behavior information. The system server **1000** sends the health care information to the second device **200** via the hospital server **200-1** or directly. Thus, the second device **200** redefines or deletes the behavior guideline by monitoring the user's health care, and systematically manages the user's health.

[0312] In addition, the insurance company server **300-1** selects one of insurance brokers assigned and matches the information of the third device **300** of the selected insurance broker with the user. The third device **300** generates insurance data of the user using the insurance fee calculation algorithm and sends the generated insurance data to the system server **1000**. In some cases, the third device **300** may send the insurance data to the first device **100** or the fourth device **400**.

[0313] When the behavior guideline is changed according to the user's health care status, the system server **1000** sends the changed behavior guideline and the health care information back to the insurance company server **300-1**. Hence, the third device **300** updates and stores the insurance data based on the received information.

[0314] The users of the first device **100** and the fourth device **400** may pay for the user customized health management service using an electronic payment system.

[0315] In the system of FIG. **34**, the first device **100**, the second device **200**, the third device **300**, and the fourth device **400** can be driven by an application generated to offer the health management service. The administrator, who provides the user customized health management service, can create the application for each device and distribute the application through the system server **1000**, a separate web server (not shown), or an application store (not shown).

[0316] The user can use the health management service by installing an application on the first device **100**.

[0317] In the system of FIG. **34**, the first device **100** may include, but not limited to, the components of FIG. **2** or FIG. **13** and the system server **1000** may include, but not limited to, the components of FIG. **5**. The first device **100** and the system server **1000** may include other different components.

[0318] While the hospital server **200-1** and the insurance company server **300-1** are illustrated in FIG. **34**, the system can include a health club server (not shown), a rehabilitation clinic server (not shown), a health insurance corporation server (not shown), and a nutritionist terminal device. In this case, the behavior guideline relating to the exercise and the behavior guideline about the rehabilitation program or the diet can be provided to the user by the respective server to manage the overall user's health.

[0319] Besides, the system of FIG. **34** can include an emergency rescue center server (not shown). That is, when the first device **100** includes therein a sensor for detecting various bio-signals such as a user's heart rate, temperature, blood sugar, respiration, blood pressure, motion, and weight, or is connected to the sensor to receive such bio-signals, the user's condition can be continuously monitored using the bio-signals. When determining that the user's condition is critical, the first device **100** can notify the emergency rescue center server of the emergency, the hospital server **200-1**, or the fourth device **400** via the system server **1000** or directly. The emergency notification can also be sent to a network server such as Social Network Service (SNS) server.

[0320] FIG. **35** depicts the first device **100** which obtains the user's condition by collecting data from not only the various external objects **10** through **40** but also various sensors **50** and **60**.

[0321] Referring to FIG. **35**, when a thermometer **50** attached with a short-range wireless communication tag **51** is accessed by the first device **100**, a user's temperature information can be collected. The first device **100** may also collect blood sugar information by communicating with the blood sugar sensor **60** attached to the user's body. Additionally, data can be collected from various bio-signals.

[0322] FIG. **36** is a flowchart of a user customized health management method of the user terminal device when the emergency is notified using the bio-signal. Referring to FIG. **36**, the user terminal device generates the behavior information by collecting data from various nearby objects (S**3610**).

[0323] The user terminal device receives the bio-signal separately from the behavior information collection (S**3620**), and generates the health care information by considering all of the bio-signal and the behavior information (S**3630**).

[0324] Hence, the user terminal device can manage the health more accurately than the health care information generation by calculating the evaluation score according to whether the behavior guideline and the behavior information match. That is, the user terminal device determines that the user's health gets better when the behavior information corresponds to the behavior guideline over a certain degree and the bio-signal nears to a reference value. For example, when the behavior guideline is focused on the weight loss, the user consistently sticks to the dietary meal and the exercise as defined by the behavior guideline, and the user's weight gets closer to the goal weight, the user terminal device can determine the user's weight loss is successful. In contrast, when the user's weight is not reduced to the goal weight or changes little although the user follows the behavior guideline, the behavior guideline can be intensified.

[0325] Additionally, when the user's bio-signal such as temperature, blood sugar, blood pressure, and heart rate satisfies a preset abnormal condition (S**3640**), the user terminal device outputs the alarm signal (S**3650**). The alarm signal can be output in the form of a visual message, a sound message, and a vibration. The user terminal device may send the alarm signal to an external device, in addition to the alarm signal output by the user terminal. The external device can employ various devices such as system server **1000** and second through n-th devices **200** through n.

[0326] While the first device **100** is a user terminal device wearable on the user's wrist in FIGS. **3** and **35**, the first device **100** may be implemented using a user terminal device such as mobile phone.

[0327] FIG. **37** depicts the first device **100** being the mobile phone.

[0328] Referring to FIG. **37**, the first device **100** can receive and utilize data generated by a separate information collector **3000**. The first device **100** can receive the data using the short-range wireless communication. The short-range wireless communication can include various technologies such as NFC, Bluetooth, Wi-Fi, Zigbee, barcode, and QR code.

[0329] The information collector **3000** can be constructed as shown in FIG. **38**.

[0330] Referring to FIG. **38**, the information collector **3000** includes a sensor **3010**, an exercise volume calculator **3020**, a

controller **3030**, a short-range wireless communication module **3040**, and a communication unit **3050**.

[0331] The sensor **3010** senses the user's motion. In detail, the sensor **3010** can include an accelerometer. The accelerometer can include 2 axes or 3 axes. The accelerometer calculates a pitch angle and a roll angle.

[0332] The exercise volume calculator **3020** analyses the user's exercise volume by using the value sensed by the sensor **3010**. For example, the exercise volume calculator **3020** calculates the exercise time, a pace count, a movement distance, a calorie consumption, a total calorie consumption, an exercise intensity, and a basal metabolic rate. Among them, information such as calorie consumption, calorie consumption per mile, movement distance, and calorie consumption during jogging can be calculated using the following equations.

$$CC=MC*M*0.00006213$$

$$MC=3.7103+(0.2678*W)+(0.0359*(P*60*0.00006213)*2)*W$$

$$M=((H=100)*P)/100$$

$$JC=(33.3+0.178*(JP-150)*W)/100 \quad \text{[Equation 1]}$$

[0333] M denotes the movement distance, MC denotes the calorie per mile, CC denotes the calorie consumption, W denotes the weight, P denotes the pace count, H denotes the height, JC denotes the calorie consumption during jogging, and JP denotes the jogging pace count.

[0334] When the exercise volume is calculated according to the various items as expressed in Equation 1, the behavior guideline can be set according to various items such as movement distance, calorie consumption, calorie per mile, and jogging pace count.

[0335] For example, when the user terminal device itself generates the behavior guideline and the user inputs the current weight, the goal weight, and the exercise period in the basic information, the weight to reduce within the exercise period is calculated. Hence, a maximum intake calorie a day and a calorie to consume through the daily exercise are calculated, and the jogging pace count and distance corresponding to the calorie consumption calculated based on Equation 1 can be calculated. Therefore, an adequate behavior guideline for the user can be established.

[0336] The communication unit **3050** receives the bio-signals by communicating with the nearby sensors. For example, the communication unit **3050** can receive the bio-signals from a scale, a blood glucose monitor, an ictometer, and a blood pressure manometer. The communication unit **3050** can communicate with the nearby sensors using a wired communication technique besides the wireless communication techniques such as Wi-Fi, Bluetooth, and Zigbee. While the communication unit **3050** is separated from the NFC module **3040** in FIG. **38**, the NFC module **3040** can be used to receive the information of the nearby sensors when the nearby sensors include an NFC tag. In this case, the communication unit **3050** can be omitted.

[0337] The controller **3030** stores the exercise volume calculated by the exercise volume calculator **3020** and the bio-signals received at the communication unit **3050**, in the NFC module **3040**. The NFC module **3040** includes the NFC tag. In some cases, the NFC module **3040** can include an NFC reader together with the NFC tag.

[0338] The NFC tag can include an Integrated Circuit (IC) and an antenna coil. When the first device **100** including the NFC reader is tagged, the NFC module **3040** is driven by radio waves emitted by the NFC reader and sends an RF signal carrying information stored in the NFC tag. The antenna coil in the NFC tag induces currents according to the radio waves emitted by the NFC reader. The induced currents are charged to a capacitor of the NFC tag. The IC is driven by the currents charged in the capacitor to generate the RF signal by modulating and coding the pre-stored information.

[0339] The NFC module **3040** can generate the RF signal according to preset modulation and coding schemes of various modulation and coding schemes. That is, the modulation loads data by shifting an amplitude, a frequency, and a phase of RF carrier signals exchanged between the NFC tag and the reader. The modulation can use Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), and Phase Shift Keying (PSK). The ASK shifts the amplitude of the carrier signal according to whether a digital information signal is 0 or 1. For example, the amplitude of the carrier signal is reduced when the information signal is 0 and increased when the information signal is 1. 2-level amplitude can carry 1 bit, and 4-level different amplitudes can carry 2 bits concurrently. The FSK allocates 0 and 1 bits being the digital signal to two-type frequencies (low frequency and high frequency). For example, the information signal of 0 is transmitted over a lower frequency than the carrier frequency, and the information signal of 1 is transmitted over a higher frequency than the carrier frequency. The PSK shifts the phase of the carrier wave according to the data to transmit. The shift of the phase is determined by the data. The information is transmitted bit by bit by shifting the phase of the carrier wave by 180 degrees when the data to transmit is 0 and by 90 degrees when the data is 1. The coding scheme can use a Modified Miller coding and a Manchester coding.

[0340] The modulation and coding schemes can be properly selected according to the type and the environment of the device. For example, when the NFC tag is a passive type which is unpowered and driven by the current induced by the radio waves from the NFC reader, the ASK and the Manchester coding can be applied. By contrast, when the NFC tag is an active type which includes its own power supply and communicates with the external NFC reader, the ASK and the Modified Miller coding can be applied at the rate of 106 kbps and the ASK and the Manchester coding can be applied at the rate of 212 kbps and 424 kbps.

[0341] As above, various data required to generate the user's behavior information can be collected and stored by the information collector **3000**, and then transmitted to the first device **100** when accessing the first device **100**.

[0342] The first device **100** can generate the behavior information using the data received from the information collector **3000**, and provide the health management service using the behavior information and the behavior guideline.

[0343] Meanwhile, the first device **100** may include various sensors therein to thus directly sense the data. The system server **1000** may be implemented using a microserver and embedded in the first device **100**.

[0344] FIG. **39** is a block diagram of the first device **100** when it includes various sensors and the system server **1000**.

[0345] Referring to FIG. **39**, the first device **100** includes a short-range wireless communication reader **3910**, a control-

ler **3920**, an exercise volume calculator **3930**, a first sensor **3940**, a storage **3950**, a second sensor **3960**, and a server **1000**.

[0346] The first sensor **3940** includes a sensor for sensing the user's motion. The exercise volume calculator **3930** calculates the exercise volume of the user by analyzing the motion sensed by the first sensor **3940**. The controller **3920** stores the calculated exercise volume to the storage **3950**.

[0347] The second sensor **3960** senses the biological information such as user's temperature, blood sugar, and blood pressure. The biological information sensed by the second sensor **3960** can differ according to the position of the second sensor **3960** or the first device **100**. For example, when the position and the type (e.g., a wrist band type) of the second sensor **3960** or the first device **100** can measure the blood pressure, the second sensor **3960** can sense the blood pressure. When the position and the type (e.g., a hair band type) of the second sensor **3960** or the first device **100** are attached to the skin, the second sensor **3960** can sense the temperature.

[0348] The controller **3920** stores the data read by the short-range wireless communication reader **3910**, the exercise volume calculated by the exercise volume calculator **3930**, and the biological information sensed by the second sensor **3960** to the storage **3950**. Using the stored information, the controller **3920** can generate the behavior information and the health management information. The generated information can be provided to the server **1000**. The server **1000** can perform the operations of the system server as described in the various embodiments.

[0349] While the system server **1000** is implemented as the microserver and embedded in the first device **100** in FIG. **39**, the system server **1000** may be implemented using a microserver embedded in the device such as second device **200**, third device **300**, and fourth device **400**.

[0350] FIG. **40** depicts the system of FIG. **1**, which is a cloud network system **3300**. That is, the system server can be implemented using a cloud server **1000**. The cloud network system **3000** can include the cloud server **1000** and various platforms **3400**.

[0351] The first device **100**, the second device **200**, the third device **300**, and other devices **3350** and **3360** can be connected to the cloud network system **3000** via a network relay devices such as routers **3310**, **3320**, and **3330** and switch **3340**. Hence, the user customized health management service can be provided according to various implementations.

[0352] Meanwhile, the first device **100** can be implemented using various devices such as mobile phone, PDA, tablet PC, MP3 player, laptop computer, and electronic notebook. According to characteristics of the device, various components can be added to the first device **100**.

[0353] FIG. **41** is a block diagram of various components which can be added to the first device **100**.

[0354] Referring to FIG. **41**, the first device **100** includes a short-range wireless communication unit **110**, a controller **120**, a storage **130**, an input **140**, a display **151**, a speaker **152**, a communication unit **160**, a voice recognition part **170**, a motion recognition part **180**, a sensor **4100**, external input ports **4200-1** through **4200-*n***, and a power unit **500**.

[0355] The display **151** includes a display panel, a backlight unit, and so on. The display **151** displays various information input screens or information display screens.

[0356] The storage **130** can store various programs or data relating to the operations of the first device **100**, user's setup information, system operating software, various application programs, and operation information corresponding to the user's control.

[0357] The sensor **4100** detects the motion or the status of the user wearing the first device **100**. In FIG. **41**, the sensor **4100** can include various sensors including a touch sensor **4110**, a magnetometer **4120**, and an accelerometer **4130**. In addition, the sensor **4100** may further include various sensors such as temperature sensor, heart beat sensor, and blood sugar sensor.

[0358] The touch sensor **4110** can adopt a capacitive type or a resistive type. The touch sensor **4110** is embedded in the display **110**. When the user touches a surface of the display **110**, the touch sensor **4110** detects and notifies the touch to the controller **120**. The controller **120** can calculate coordinates of the touch point and determine which menu the user selects on the screen.

[0359] The magnetometer **4120** detects rotation and movement direction of the first device **100**, and the accelerometer **4130** detects acceleration and the tilt of the first device **100**. The controller **120** can detect the user's motion using output values sensed by the magnetometer **4120** and the accelerometer **4130**, to thus determine the user's exercise volume, intensity, and time. The determined information can be applied to the behavior information.

[0360] The communication unit **160** communicates with various external devices using various communication schemes. The controller **120** can send and receive the behavior information, the behavior guideline, the health care information, and other messages to and from the outside through the communication unit **160**.

[0361] The communication unit **160** can include various communication modules of a broadcasting receiver module **161**, a mobile communication module **162**, a GPS module **163**, and a wireless communication module **164**.

[0362] Herein, the broadcasting receiver module **161** can include a terrestrial broadcasting receiver module (not shown) including an antenna for receiving a terrestrial broadcasting signal, a demodulator, and an equalizer, and a DMB module for receiving and processing a DMB broadcasting signal. When the first device **100** is a mobile device such as mobile phone with the broadcasting receiving function, the broadcasting receiver module **161** is required.

[0363] The mobile communication module **162** accesses a mobile communication network for the communication in conformity with various mobile communication standards such as 3rd Generation (3G), 3rd Generation Partnership Project (3GPP), and Long Term Evolution (LTE).

[0364] The GPS module **163** receives a GPS signal from a GPS satellite and detects the current location of the first device **100**. Using the GPS module **163**, the controller **120** can calculate the user's movement distance and speed by detecting the location of the user at different points in time. Hence, the controller **120** can calculate the user's exercise volume.

[0365] The wireless communication module **164** accesses an external network for the communication in conformity with a wireless communication protocol such as Wi-Fi and IEEE.

[0366] By use of the mobile communication module **162** or the wireless communication module **164**, the controller **120** can communicate with the system server **1000** and other devices.

[0367] The short-range wireless communication unit **110** includes the short-range wireless communication reader or the short-range wireless communication tag as mentioned above, and communicates with the external device using the short-range wireless communication. The controller **120** can collect various data relating to the user's behavior from the external devices through the short-range wireless communication unit **110**. The short-range wireless communication unit **110** can perform the short-range wireless communication in conformity to the communication protocol such as NFC, Wi-Fi, Zigbee, and Bluetooth.

[0368] According to various user selection signals input through the input **140** and the touch sensor **4110**, the controller **120** can conduct various operations by selectively activating the components. In detail, the controller **120** can provide the health management service according to various implementations. Besides, the controller **120** may recognize voice input or motion input in addition to the touch manipulation, and perform the operation corresponding to the input. In this case, the controller **120** can activate the voice recognition part **170** and the motion recognition part **180**.

[0369] The voice recognition part **170** collects user's voice or external sound using a voice acquisition means such as microphone (not shown) and sends it to the controller **120**. In a voice control mode, when the user's voice matches a preset voice command, the controller **120** can perform a task corresponding to the user's voice.

[0370] The motion recognition part **180** captures a user's image using an image capturing means (not shown) such as camera, and provides the image to the controller **120**. In a motion control mode, the controller **120** analyzes the user's image and performs the operation corresponding to the motion gesture when determining the user's motion gesture corresponding to a preset motion command.

[0371] The controller **120** provides the health management service according to the user's voice command and motion command input through the voice recognition part **170** and the motion recognition part **180**. Specifically, the controller **120** can perform the short-range wireless communication with the external object or the communication with the external devices. Besides the aforementioned health management service, the controller **120** may offer various services such as broadcasting reception service and content play service. These services can be provided by executing the application stored in the storage **130**.

[0372] The external input ports **4200-1** through **4200-*n*** can be connected to a variety of external devices respectively and receive data, programs and control commands. In detail, the external input ports **4200-1** through **4200-*n*** can include a USB port, a headset port, and so on. In addition to the short-range wireless communication, the controller **120** may receive data from the external object through at least one of the external input ports **4200-1** through **4200-*n***.

[0373] The power unit **500** supplies power to the components of the first device **100**. The power unit **500** can include a positive current collector, a positive electrode, electrolyte, a negative electrode, a negative current collector, and a coating part covering them. The power unit **500** may be implemented using a rechargeable secondary battery. The power unit **500** can be implemented using a rechargeable secondary battery such as lithium-ion battery.

[0374] While various components of the first device **100** are depicted in FIG. **41**, it is not necessary that the first device **100** include all of the components. That is, some of the components can be omitted or added according to the product type of the first device **100**, and or replaced by other components.

[0375] FIG. **42** is a detailed block diagram of the controller **120**.

[0376] Referring to FIG. **42**, the controller **120** includes a system memory **121**, a main CPU **122**, an image processor **123**, a network interface **124**, a storage interface **125**, first through n-th interfaces **126-1** through **126-*n***, an audio processor **127**, and a system bus **128**.

[0377] The system memory **121**, the main CPU **122**, the image processor **123**, the network interface **124**, the storage interface **125**, the first through n-th interfaces **126-1** through **126-*n***, and the audio processor **127** are interconnected through the system bus **128** to transmit and receive various data and signals.

[0378] The first through n-th interfaces **126-1** through **126-*n*** support interfacing between the various components including the sensor **4100** and the components of the controller **120**.

[0379] The sensor **4100** of FIG. **42** is connected only through the first interface **126-1**. When the sensor **4100** includes the various sensors as shown in FIG. **41**, each of the sensors can be connected through the interface. At least one of the first through n-th interfaces **126-1** through **126-*n*** may be implemented using a button of a main body of the first device **100**, or an input interface for receiving various signals from the external device connected via first through n-th external input ports.

[0380] The system memory **121** includes a read only memory (ROM) **121-1** and a random access memory (RAM) **121-2**. The ROM **121-1** stores an instruction set for the system boot-up. When a turn-on instruction is input and the power is supplied, the main CPU **122** copies O/S stored in the storage **130** to the RAM **121-2** and boots up the system by executing the O/S according to the instruction stored to the ROM **121-1**. When the booting is completed, the main CPU **122** copies various application programs stored in the storage **130** to the RAM **121-2**, and performs various operations by running the application programs copied to the RAM **121-2**.

[0381] By running the application program stored in the storage **130**, the main CPU **122** can receive data from the external object and generate the behavior information by processing the data. The main CPU **122** can generate the health care information by comparing the behavior guideline and the behavior information according to the application program execution. Alternatively, the main CPU **122** may provide the system server **1000** with various information such as user's basic information, behavior information, and health care information, and thus offer the health management service together with the system server **1000**.

[0382] The storage interface **125** is connected to the storage **130** to transmit and receive various programs, contents, and data.

[0383] The image processor **123** can include a decoder, a renderer, a scaler, and so on. The image processor **123** decodes the data received from the system server **1000** or the external devices, constructs a frame by rendering the decoded data, and scales a size of the constructed frame in accordance with the screen size of the display **151**. The image processor **123** provides the processed frame to the display **151** to display the frame. The generated frame can include various screen frames of FIGS. **14** through **29**.

[0384] The audio processor **127** processes and provides audio data to a sound output means such as speaker **152**. The

audio processor **127** reads various alarm sound data from the storage **130** and generates the alarm sound signal using the read data. The generated alarm sound signal can be output through the speaker **152**. Also, various information such as basic information, behavior information, and health care information may be generated as voice signals and output through the speaker **152**.

[0385] The network interface **124** is connected to the external devices over the network. For example, when a web browser program is executed, the main CPU **122** accesses the web server through the network interface **124**. When receiving web page data from the web server, the main CPU **122** generates a web page screen by controlling the image processor **123** and displays the generated web page screen in the display **151**. When the system server **1000** is the web server, the controller **120** can access the system server **1000** through the network interface **124**.

[0386] The above-stated various operations of the controller **120** can be executed by running various programs stored to the storage **130**.

[0387] All of the components of the controller **120** are depicted in FIG. **42**. According to implementations, some of the components can be omitted, changed, or added.

[0388] FIG. **43** depicts software architecture of the storage **130** to support the operations of the controller **120** according to various aspects of exemplary embodiments. Referring to FIG. **43**, the storage **130** includes a base module **4310**, a device management module **4320**, a communication module **4330**, a presentation module **4340**, a web browser module **4350**, and a service module **4360**.

[0389] The base module **4310** is a base module for processing signals received from the hardware of the first device **100** and sending the processed signals to a higher layer module.

[0390] The base module **4310** includes a storage module **4311**, a location based module **4312**, a security module **4313**, and a network module **4314**.

[0391] The storage module **4311** is a program module for managing a database (DB) or a registry. The location based module **4312** is a program module for supporting a location based service in association with hardware such as GPS chip. The security module **4313** is a program module for supporting hardware certification, request permission, and secure storage. The network module **4314** supports the network connection and includes a DNET module and an UPnP module.

[0392] The device management module **4320** manages and utilizes the external input and the external device information. The device management module **4320** can include a sensing module **4321**, a device information management module **4322**, and a remote control module **4323**.

[0393] The sensing module **4321** analyzes sensor data provided from the various sensors of the sensor **4100**. The sensing module **4321** can include a face recognition module, a voice recognition module, a motion recognition module, and an NFC recognition module. The device information management module **4322** provides information about various devices, and the remote control module **4323** is a program module for remotely controlling peripheral devices such as phone, TV, printer, camera, and air conditioner.

[0394] The communication module **4330** is a module for communicating with the outside. The communication module **4330** can include a messaging module **4331** such as messenger program, Short Message Service (SMS) and Multimedia Message Service (MMS) program, and Email program, and a telephony module **4332** including a Call Info Aggregator program module and a VoIP module.

[0395] The presentation module **4340** is a module for generating the display screen. The presentation module **4340** includes a multimedia module **4341** for playing and outputting multimedia content, and a UI & graphics module **4342** for processing the UI and graphics. The multimedia module **4341** can include a player module, a camcorder module, and a sound processing module. Accordingly, the multimedia module **4341** plays various multimedia contents, and generates and plays the screen and the sound. The UI & graphics module **4342** can include an image compositor module **4342-1** for combining images, a coordinate combination module **4342-2** for combining and generating coordinates on the screen for displaying the image, an X11 module **4342-3** for receiving events from the hardware, and a 2D/3D UI toolkit **4342-4** for providing a tool for creating the 2D or 3D UI.

[0396] The web browser module **4350** accesses the web server through the web browsing. The web browser module **4350** can include various modules such as web view module for creating the web page, download agent module for downloading, bookmark module, and Webkit module.

[0397] The service module **4360** indicates an application module for providing various services. For example, the service module **4360** can include various modules such as navigation service module for providing map, current location, landmark, and route information, game module, and advertisement application module. In detail, the service module **4360** can include the application for executing the health management service according to various implementations.

[0398] The main CPU **122** of the controller **120** accesses the storage **130** through the storage interface **125**, duplicates the various modules stored in the storage **130** to the RAM **121-2**, and works according to the operation of the duplicated module.

[0399] In detail, using the sensing module **4321**, the main CPU **122** can analyze the output values of the sensors of the sensor **4100** and generate the behavior information by obtaining the user's status. The main CPU **122** checks the registry of the storage module **4311**, detects the pre-stored behavior guideline of the corresponding user, and compares the behavior guideline and the behavior information. The main CPU **122** can generate the health care information according to the comparison and store it in the storage **130**. The main CPU **122** can determine whether it is the time to operate according to the behavior guideline, and control the image processor **123** and the audio processor **127** to output the corresponding notification message or sound.

[0400] The main CPU **122** may send various information such as a user's basic information, behavior information, behavior guideline, and health care information to the external device such as system server **1000** through the communication unit **160**.

[0401] As above, the storage **130** can store programs of diverse structures, and the controller **120** can offer the health management service using the various programs stored in the storage **130** according to various exemplary embodiments.

[0402] While the software architecture applicable to the first device **100** is illustrated in FIG. **43**, the software of this type can be applied to the system server **1000** to offer the health management service.

[0403] As set forth above, the health management system can easily collect the user's various information, determine

the behavior guideline appropriate for the user, and manage the user's health based on the behavior guideline. While the embodiments of the present general inventive concept are illustrated individually to ease the understanding, the embodiments can be realized alone or in combination.

[0404] To use the user customized health management service, the application for the service can be installed in the devices.

[0405] Specifically, an application for receiving the data about the user's behavior, generating the user's behavior information using the received data, comparing the pre-stored behavior guideline and the behavior information, and generating and storing the user's health care information based on the comparison can be installed in the user terminal device.

[0406] In the system server, an application for receiving the behavior guideline of the first device user from the second device, forwarding the behavior guideline to the first device, receiving the behavior information from the first device, generating the health care information by comparing the behavior information and the behavior guideline, forwarding the health care information to the second device, receiving the new behavior guideline from the second device, and forwarding the new behavior guideline to the first device can be installed.

[0407] In the second device, an application for displaying the behavior guideline input screen based on the user basic information, sending the behavior guideline input on the behavior guideline input screen to the system server, and generating and sending the new behavior guideline to the system server when the user's behavior information and health care information are received can be installed.

[0408] In the third device, an application for generating the insurance data of the user based on the basic information and the behavior guideline, and updating the insurance data when receiving the user's behavior information, new behavior guideline, and health care information can be installed.

[0409] Those applications can be downloaded from the web server, the system server, or various sources, or stored in a non-transitory computer readable medium and provided to the server and the devices.

[0410] The non-transitory computer readable medium indicates a medium for storing data semi-permanently and allowing for the reading of the medium by a device, rather than a medium for storing data for a short term such as register, cache, and memory. More specifically, the various application and programs as stated above can be stored to and provided by the non-transitory computer readable medium such as a CD, a DVD, a hard disc, a Blu-ray disc, a USB device, a memory card, and a ROM.

[0411] Although a few exemplary embodiments have been shown and described, it will be appreciated by those skilled in the art that changes may be made in these exemplary embodiments without departing from the principles and spirit of the general inventive concept, the scope of which is defined in the appended claims and their equivalents.

What is claimed is:

1. A user health management method comprising:

receiving data from a data source using short-range wireless communication, the data including health-related information;

determining health-related behavior information of a user based on the health-related information;

generating a health care recommendation for the user based on the health-related behavior information; and

outputting the health care recommendation.

2. The user health management method of claim **1**, further comprising:

receiving profile information comprising at least one of a weight, an age, a height, and a medical history of the user;

generating and setting a behavior guideline based on the profile information,

wherein the generating the health care recommendation for the user based on the health-related behavior information comprises evaluating the health-related behavior information based on the behavior guideline.

3. The user health management method of claim **2**, wherein the generating a health care recommendation for the user based on the health-related behavior information further comprises determining an evaluation score based on the evaluating the health-related behavior information.

4. The user health management method of claim **3**, wherein the determining the evaluation score based on the evaluating the health-related behavior information comprises:

adding positive points or a first score to the evaluation score if the health-related behavior information satisfies the behavior guideline; and

adding negative points or a second score lower than the first score to the evaluation score if the health-related behavior information does not satisfy the behavior guideline.

5. The user health management method of claim **4**, wherein the generating the health care recommendation for the user based on the health-related behavior information further comprises:

determining whether the evaluation score is greater than or equal to a predetermined threshold; and

generating an adjusted behavior guideline based on a result of the determining whether the evaluation score is greater than or equal to the predetermined threshold.

6. The user health management method of claim **5**, wherein the generating the adjusted behavior guideline comprises:

increasing an intensity of the behavior guideline if the evaluation score is greater than or equal to the predetermined threshold; and

decreasing the intensity of the behavior guideline if the evaluation score is not greater than or equal to the predetermined threshold.

7. The user health management method of claim **2**, wherein the profile information is received from at least one of the user, another user, or an external device.

8. The user health management method of claim **2**, wherein the health care recommendation comprises a new behavior guideline for the user.

9. The user health management method of claim **8**, wherein the new behavior guideline comprises a temporary behavior guideline requiring approval.

10. The user health management method of claim **9**, further comprising:

transmitting the new behavior guideline to a second device of another user authorized to provide the approval; and

receiving the approval corresponding to the transmitted new behavior guideline from the second device,

wherein the outputting the health care recommendation comprises outputting the new behavior guideline after receiving the approval.

11. The user health management method of claim **1**, wherein the data source comprises a tag attached to an object.

12. The user health management method of claim 11, wherein the short-range wireless communication comprises at least one of near field communication, reading a barcode, reading a Quick Response code, Wi-Fi communication and Zigbee communication.

13. The user health management method of claim 1, wherein the outputting the health care recommendation comprises outputting at least one of a graph based on the health-related behavior information, a notification based on the health-related behavior information, and an evaluation score based on the health-related behavior information.

14. The user health management method of claim 1, wherein the data source comprises an external sensor which monitors at least one of weight, body temperature, heart rate, blood pressure, blood sugar, speed, acceleration, and movement of the user.

15. A non-transitory computer readable medium storing computer executable instructions that are executable by a computer to perform the method of claim 1.

16. A user health management device comprising:

a short-range wireless communication reader which receives data from a data source using short-range wireless communication, the data including health-related information; and

a controller which determines health-related behavior information of a user based on the health-related information, generates a health care recommendation for the user based on the health-related behavior information, and outputs the health care recommendation.

17. The user health management device of claim 16, further comprising:

an input which receives profile information comprising at least one of a weight, an age, a height, and a medical history of the user,

wherein the controller generates and sets a behavior guideline based on the profile information, and generates the health care recommendation by evaluating the health-related behavior information based on the behavior guideline.

18. The user health management device of claim 17, wherein the controller generates the health care recommendation by determining an evaluation score based on the evaluating.

19. The user health management device of claim 18, wherein controller determines the evaluation score based by adding one of positive points or a first score to the evaluation score if the health-related behavior information satisfies the behavior guideline, and adding one of negative points or a second score lower than the first score to the evaluation score if the health-related behavior information does not satisfies the behavior guideline.

20. The user health management device of claim 19, wherein the controller determines whether the evaluation score is greater than or equal to a predetermined threshold and generates an adjusted behavior guideline based on the determining whether the evaluation score is greater than or equal to the predetermined threshold.

21. The user health management device of claim 20, wherein the controller generates an adjusted behavior guideline that increases an intensity of the behavior guideline if the evaluation score is greater than or equal to the predetermined threshold, and generates an adjusted behavior guideline that decreases the intensity of the behavior guideline if the evaluation score is not greater than or equal to the predetermined threshold.

22. The user health management device of claim 17, wherein the input receives the profile information from at least one of the user, a second user, or an external device.

23. The user health management device of claim 17, wherein the health care recommendation comprises a new behavior guideline for the user.

24. The user health management device of claim 23, wherein the new behavior guideline comprises a temporary behavior guideline requiring approval.

25. The user health management device of claim 24, wherein the controller transmits the new behavior guideline to another device of a second user authorized to provide the approval, receives the approval corresponding to the transmitted new behavior guideline from the second device, and outputs the health care recommendation comprising the new behavior guideline in response to receiving the approval.

26. The user health management device of claim 16, wherein the data source comprises a tag attached to an object.

27. The user health management device of claim 26, wherein the short-range wireless communication comprises at least one of near field communication, reading a barcode, reading a Quick Response code, Wi-Fi communication and Zigbee communication.

28. The user health management device of claim 16, further comprising

a display which displays the health care recommendation,

wherein the health care recommendation comprises at least one of a graph, a notification, and an evaluation score.

29. The user health management device of claim 16, wherein the short-range wireless communication device receives data from an external sensor which monitors at least one of weight, body temperature, heart rate, blood pressure, blood sugar, speed, acceleration, g-force and movement of the user.

30. The user health management device of claim 16, wherein the short-range wireless communication device receives data from a plurality of external sensors forming a personal area network.

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